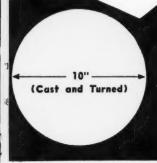
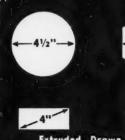
# DERN May, 1950 achine Shop

LARGE Brass Parts produced economically from ITAN Large Diameter Rods In many cases — particularly on short runs—the cost of machining large brass parts from TITAN Free-Cutting large diameter rods is substantially less than by other production methods.

Maximum sizes of standard shapes are illustrated (rectangles supplied in additional proportions to those shown). Write for folder "TITAN Large Diameter Brass Rods" for complete information on sizes and analyses available.

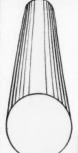






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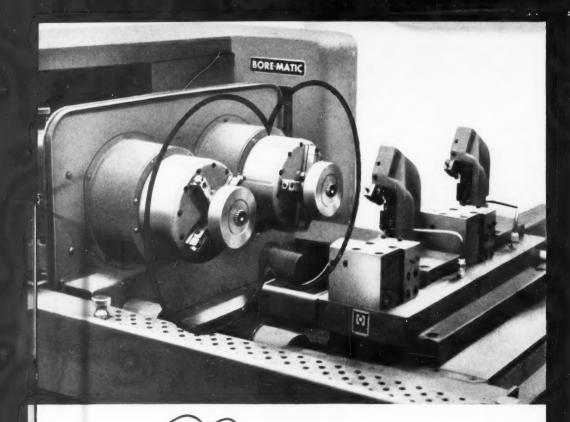
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# two heads are better than one!

The fundamental principle of doing two things at once to increase the amount produced is evidenced every day in Heald equipped factories the world over. Multiplicity of tooling and workholding equipment perform this simple A, B, C arithmetic just as surely as 1+1 equal 2. Naturally the implication is not only that two "heads" are better than one but any combination of multiple arrangements on both single and double end machines can mean increased output, greater savings for you.

### New Heald model 321 Bore-Matic doubles production over previous methods

Before this Heald machine was installed, automobile clutch hubs were processed by separate operations on two machines. Now the entire job is done, twice as fast, in a single automatic cycle on the one Heald Model 321 Bore-Matic. The work is mounted on a splined arbor held in an air-operated diaphragm chuck on each boringhead. The O.D. is turned and chamfered and both faces generated by a tool block setup on the table cross slide.

### THE HEALD MACHINE COMPANY

WORCESTER 6, MASSACHUSETTS



OLUME 22

NUMBER 12

MAY, 1950

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# Mochine Shop witents

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Plant Uses Its Own Product to Reduce Labor Costs. 236 Precision Mandrel Adapted for Second Operation Work 236 Heater Tubes Corrugated on Special Hydraulic Machine. 238 Comparator Increases Inspection Rate to 1,000 Parts Per Hour . 239 Semi-Automatic Machine for Bicycle Cranks . 241 Studs Weided to Filter Housings . 242  Ideas from Readers Boring Fixture for a Connecting Rod . 244 By Robert Mawson Simple Shaper Tool Guard . 247 By A. W. Payne Welding Spacer Collapses for Quick Release . 248 By H. G. Frommer Handy Bluing Unit . 250 By Stanley Welling New Type Stripper Screw Design . 250 By L. C. Friddle An Interesting Carbide Application . 253 By Alex J. Precoda



### OTHER INDIRECT SAVINGS IN TOOL COST AND TOOL INVENTORY

This manufacturer had cut threads on adjusting screws in the past by making several passes with a single point tool. Actual chasing time on the .623 in. diameter 8 pitch thread 13% in. long was 4.86 minutes.

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Write for Bulletins F-80 and F-90.

# LANDIS Machine CO. WAYNESBORD PENNA, U.S.A.



# Bellows ROTARY FEED TABLE CUTS DRILLING COSTS 50%



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Photographs, wiring diagrams, cost and production figures from plants using Bellows "Controlled - Air-Power" Devices to cut costs, free on request.

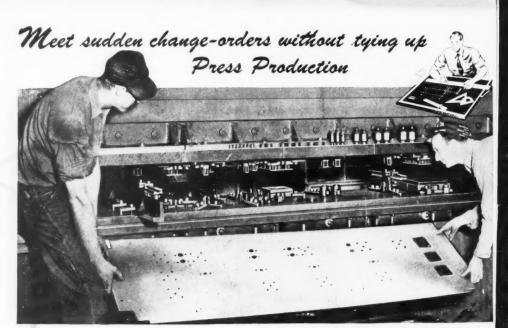
THE Bellows "Controlled-Air-Power" Rotary Work Feed Table moves parts to and away from the spindle quickly, accurately, safely. Operator loads one station while work is done at a second and ejected at a third. Can be set for 4, 6, 8, 12, or 24 station operation. Cost savings in drill press operations of 25-30% are common, 50% or more not unusual.

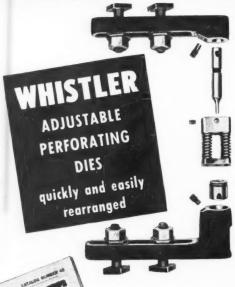
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AKRON, OHIO

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H.W Precision

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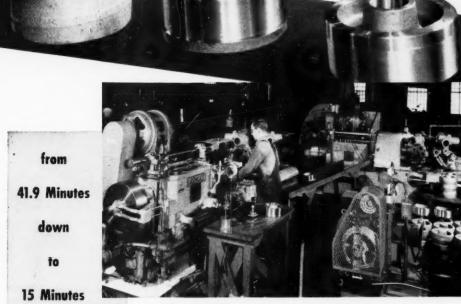
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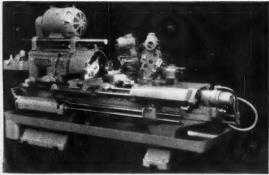
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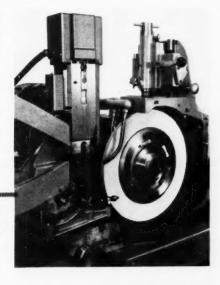
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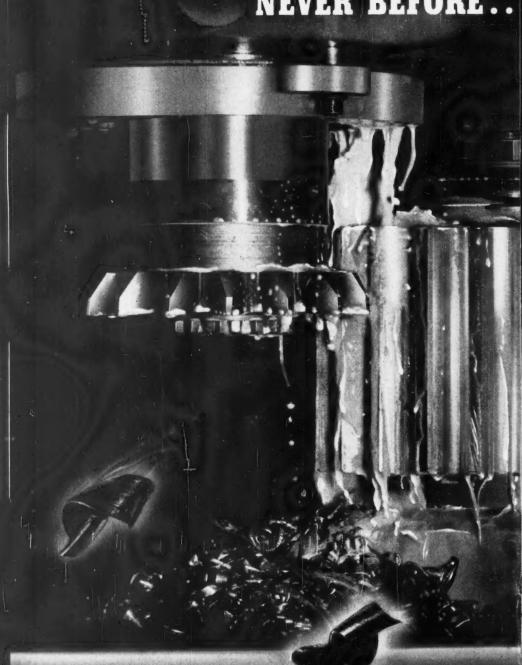
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Name

Title\_

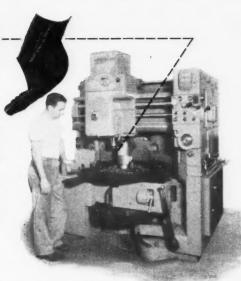
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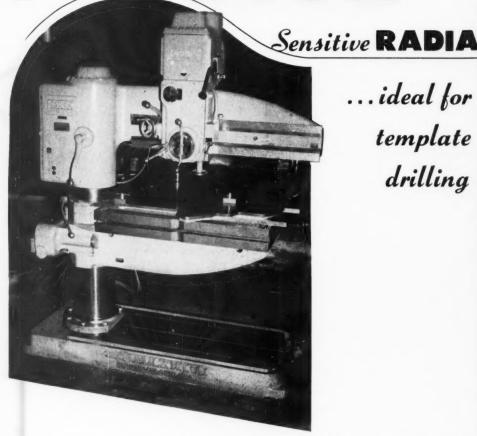


Big heavy chips from a 0.040" feed per.stroke...smoking hot ... burned blue as the husky Fellows Cutter shears them from a 5" face width SAE 1020 steel gear blank! Never before the advent of the big No. 36 Gear Shaper were such feeds and chatter-free power application possible. Here is massive construction and great rigidity with selective gear-shift and quick dial-set feed and speed controls. You shift over from heavy-duty roughing to fine-cut finishing in 8 to 10 seconds...Whether you cut coarse-pitch BIG GEARS or their mating PINIONS, spur, helical or herringbone teeth, here is your one best buy for jobbing or production work. For more complete details and specifications, call on the nearest Fellows Office.

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OSDICK



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\* The combined advantages of Radial design and Sensitive drilling make this machine ideal for template drilling. The adjustable, swinging table also works out advantageously on this job as well as many other types of work.

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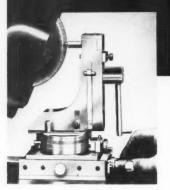
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with Machine Shop TIME SAVERS

by 188

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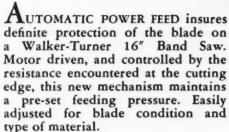
J & S "Down-Hold" VISE JAWS and "Attachable" PARALLELS, used with regular vises, save 25% to 75% on loading time! VISE JAWS force work-piece down—"stops" provide accurate position. Eliminate hammering, feeler gauges, allow repetitive operation. PARALLELS snap into place, are forced down so chips can't get under them. Eliminate wiping vise and parallels after each operation. Both Vise Jaws and Parallels easily attached to any type and size machine vise.

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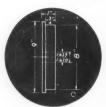
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- Turning, facing, drilling, boring, reaming, threading, tapping
- Roughing cuts, finishing cuts
- Tools of high speed steel—tools of cemented carbide



material: tools: operation	CMM 320 carbide	
	speed	feed
face	608	.018
ctr. drill	1200	Н
turn	842	.020
neck	315	Н
chamfer	449	н



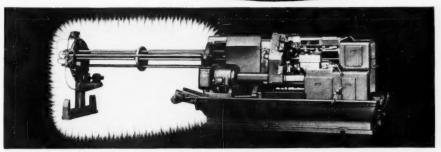
material: tools:	aluminum H.S.S.	
operation	speed	feed
face	1200	.015
turn	1200	.018
ctr. drill	1200	Н
drill	1200	Н
top	315	Н

All demand a wide range of spindle speeds! And Tray-Top is the only economy-priced light duty lathe that gives you twelve speeds—all geared—in geometrical progression, 40 to 1 overall ratio. Quick, 3-lever speed selection with direct-reading "color match" dial. A choice of three speed ranges: 20 to 820, 30 to 1200, 45 to 1800 rpm ... Totally enclosed quick change gear box ... 48 thread and feed changes ... flame hardened gears in headstock, change gear box and apron ... convenient "parking space" for tools, etc.—these and many other features make Tray-Tops

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Cincinnati 9, Ohio, U. S. A.

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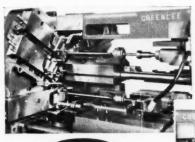
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Left, stations 1, 2, and 3 of a machine set up for multiple feed-out. The piece in this case is 16-3/32" long and requires only forming to a smaller diameter at one end. Live bushings ahead of the stops are used to prevent whipping.

Below, rear view of the same machine, showing positions 4, 5, and 6. The stock feeds out at positions 1, 3, and 5 and is formed. Cut-offs are at positions 2, 4, and 6 and chutes (not shown) are rigged to slide finished pieces away from the working area.





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MULTIPLE SPINDLE DRILLING, BORING, TAPPING MACHINES . AUTOMATIC SCREW MACHINES . AUTOMATIC TRANSFER PROCESSING MACHINES



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Style 9432 — Adjustable Thread Snap Gage



Style 9324 · Flange-type External Ring Gage



Style 9310 — Double end Plain Cylindrical Plug Gage



Style 9410 — Double-end Thread Plug Gage, Reversible Construction

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360 CYCLE O'TOOL

AIR

THE ROTOR TOOL CO.

CYCLE

CLEVELAND, OHIO

# MORE OPERATIONS AT ONCE

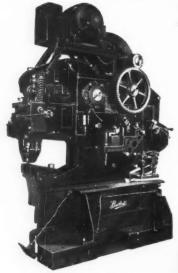
### YOUR KEY TO LOW-COST FABRICATION

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360-D for all details on all models available to suit your particular requirements in these rugged, fast, accurate multiple-operation machines.



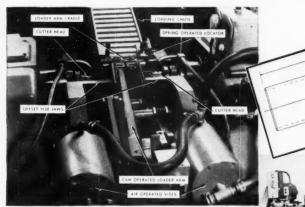
### BUFFALO FORGE COMPANY

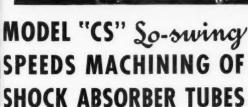
388 BROADWAY BUFFALO, N. Y. Canadian Blower & Forge Co., Ltd., Kitchener, Ont.



# MACHINE OF THE MONTH

PREPARED BY THE SENECA FALLS MACHINE CO. "THE So-owing PEOPLE" SENECA FALLS, NEW YORK





Problem: To automatically load, unload and machine both ends of Hydraulic Shock Absorber Tubes at high production rate.

Solution: The Model "CS" Lo-swing Automatic Drilling and Centering Machine selected for this job was equipped with an automatic loader of the type shown in the mall illustration.

The tubes, which are cut 1/16" over the required ength, are fed into the upper chute, shown in the arge illustration, and ejected into the lower chute ther being machined. Details of the loading arm, which is cam operated, are also shown in this illustration. Tubes are fed by gravity down the loading chute not the loading arm cradle where they are properly positioned lengthwise by a spring operated locator. The loading arm then lowers the tube into the air-

operated vise jaws where it is securely clamped, after which the loading arm is raised to pick up the next piece.

When the loading phase of the cycle is completed, the two revolving cutter heads advance in rapid traverse and slow down into feed just before the tools reach the work. Three cutters are used in each head... one cutter for facing to overall length, one for rounding the bore, and one for chamfering the O. D. The machining completed, the cutter heads retract in rapid traverse and the vise jaws open, allowing the finished part to drop into the unloading chute. The complete cycle is slightly under five seconds per piece, assuring a production of 750 pieces per hour.

Engineered jobs are our specialty. Seneca Falls is at your disposal to assist in solving your problem.

SENECA FALLS MACHINE CO., SENECA FALLS, N. Y.

PRODUCTION COSTS ARE LOWER WITH So-swing



# DRILL 6 HINGE HOLES IN ALL TYPES AND SIZES OF REFRIGERATOR CABINETS



# MOR-SPEED PRODUCTION MACHINE

Saved PRODUCTION TIME
Saved MULTIPLE HANDLING
Saved DELAY BETWEEN OPERATIONS
Saved FLOOR SPACE

A leading refrigerator manufacturer makes a wide range of cabinet types and sizes. Some have right hand, some left hand, door mounting. Location and centers on hinges vary. About the only standard is the spacing of two 1/4" and one 3/16" hole for each hinge. Morris Engineers designed and with the instruction of the standard of the s

built the illustrated machine which handles all cabinets now being made and will handle future models within limits. Drilling heads and fixtures are mounted on T-slotted slides and are quickly and easily adjusted for any cabinet. From the conveniently located control panel, the operator loads and clamps the work-piece, presses the start button. At the completion of the operation, the clamps release automatically. Production is limited only by the loading and unloading ability of the operator.

loading ability of the operator.

If you have a production operation or series of operations consuming too much time, consult Morris. They will gladly submit an "estimate of savings" that can be accomplished with a Morspeed Production Machine. No obligation, of course.



#### MOR-SPEED RADIALS . . .

. . . every feature for fast, economical drilling, boring, reaming, facing and tapping.



Merris also builds a line of 9", 11" and 13" Column Radial Drills with outstanding features which contribute to easy operation, sustained accuracy and long service life. Details on request.



933 HARRIET STREET CINCINNATI 3, OHIO

"A better product
at less cost
with MORRIS ENGINEERED PRODUCTION"

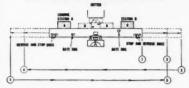
### Looking for savings?

# 48% PRODUCTION BOOST REPORTED ON THIS OPERATION



Here's a Kearney & Trecker Chucking Table milling machine with automatic cycle and Mono-Lever Control giving a 48% boost to production of this worm wheel housing. Mono-Lever Control and automatic table operation is the answer.

HOW JOB IS DONE
USING AUTOMATIC TABLE CYCLE AND MONO-LEVER CONTROL



- Operator loads (A) and engages Mono-Lever. Table advances in rapid traverse to point of cut on workpiece (A) at (2).
- Feed dog changes rapid traverse to selected table feed for cut on (A). Operator loads at station (B).
- Upon completion of cut stop and reverse dogs reverse table in rapid traverse to point of cut on workpiece (B).
- Feed dog changes rapid traverse to selected table feed on (B). Operator unloads and reloads at Station (A).
- Stop and reverse dogs reverse table in rapid traverse to point of cut on workpiece (A).
- 6. Cycle repeats from (2).

Diagram shows setup for reciprocal milling. Operator engages Mono-Lever only once for entire run — spends the rest of his time loading and unloading work-pieces. Table moves constantly, idle cutter time is at a minimum.

#### COMPARE

To h

Production by old method.

Production gain using a Kearney & Trecker
Milling Machine with Mono-Lever Control and
Automatic Table Cycle.

HERE'S GRAPHIC PROOF OF SAVINGS RESULTS

16%

16%-49%

49%-96%

The minimum over-all savings reported from any

- The minimum over-all savings reported from any job when done on a Kearney & Trecker Milling Machine with Mono-Lever Control and Automatic Table Cycle.
- The majority of over-all savings from jobs done on these machines fall here.
- Under favorable conditions, several jobs done on these machines have shown savings like this?

WHEN it comes to boosting production there's nothing else like them. We mean Kearney & Trecker Milling Machines with Mono-Lever Control and Automatic Table Cycle

Cycle

Take a look at the job described here and the bar graph at lower left. See how these machines have cut milling costs for others 16% to 96%! Yes, and they can do the same for your.

for you! Contact us or our nearest representative. Cet proven facts on how Kearney & Trecker's milling machines with Mono-Lever Control and Automatic Table Cycle can cut your costs, increase your savings. Kearney & Trecker Corp., 6784 W. National Ave., Milwaukee 14, Wis.





Photograph shows a  $10^{\prime\prime}$  OK Bevel End Mill with forged Rexalloy Blades, mounted on a Cincinnati Hydrotel vertical milling machine. Picture was taken half way through the 72 $^{\prime\prime}$  roughing cut. Eight minutes is fast time for a cut  $5/16^{\prime\prime}$  deep.

OK Inserted Blade Milling Cutters look good on all types of jobs. Blades can be repeatedly set out and reground, adding long hours to their life. In addition, you get a better finish, faster time, more accuracy. Investigate what they will do for you.





two 4400 lb. castings

Two sand cores washed out when these giant 4400 pound steel connecting rods were cast, resulting in solid eye ends without gaps. Then came the \$564 question—how to machine out the 1/2" slots in the longitudinal center of the eyes which were 22" high and had a wall thickness of 61/2".

The Ernest J. Nelson Iron Works of San Francisco, did this "impossible" job easily, quickly and economically, without special tooling, on a standard Model No. 8M/2 MARVEL Band Saw. Two cuts were made in each rod in two hours per cut with tool cost of \$3.06 per rod. The tool was a MARVEL B9-10 Band Saw Blade.

Every tool room, machine shop and maintenance department needs a MÄRVEL Series 8 Universal Band Saw—not only for innumerable everyday jobs but for the occasional "trick" operations, where its utmost versatility will save many head-aches and dollars.

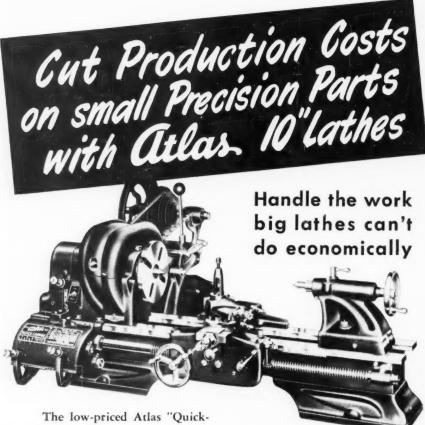
WRITE FOR CATALOG

### These exclusive MARVEL features made this

- job easy: 1. Large, T-slotted work table.
- 2. Blade feeds into work vertically; work always stationary.
- 3. Power-pressure feed. 4. Automatic blade tension.
- 5. Built-in coolant system.
- 6. Large capacity.



ARMSTRONG - BLUM MFG. CO. 5700 Bloomingdale Ave., Chicago 39, Illinois



The low-priced Atlas "Quick-Change" 10" Lathe is tops in the shop—for precision work and economy. With 10" swing (65%" over carriage), 24" and 36" between centers, and 16 spindle speeds from 28 to 2072 RPM, it has the capacity for most small parts operations—and it's much cheaper to run than bigger lathes.

Instant selection of 54 threads and feeds saves set-up time, speeds production. And with its heavy, massive construction, precision-ground ways, and Timken Tapered Roller Bearings, the Atlas is an accurate, smooth-operating

lathe that is ideal for both 'round-theclock production and tool room use.

Atlas standard 10" lathes start at \$212.00 F.O.B., Kalamazoo — "Quick-Change" at \$272.00. Send for latest catalog with complete facts.



# with Ross Full-Flo In-Line Valve you get Full Pipe Capacity!

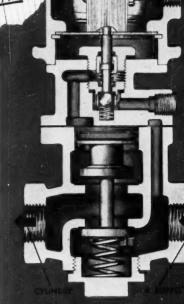
- Full Line Capacity
- Positive Seal
- High Speed Operation

NOT THIS

- Low First Cost
- Low Operating Cost
- Low Maintenance Cost
- Over 500 Straightway and 3-Way Models in 1/4"-11/4" Sizes

### Ask Ross for Any Air Control Information

Ross makes valves only—hundreds of types and sizes. Take advantage of the experience gained in over a quarter century of concentration on control and application of air power!





Solenoid-Pilot Sections interchangeable on all 24 Ross-In-Line Bodies.

ROSS OPERATING VALVE CO.

### THE NEW

# Van Keuren 0 to 3" LIGHT WAVE MICROMETER

vour product . . .



#### CATALOG AND HANDBOOK No. 34

This 208-page volume represents 2 years research sponsored by the Van Keuren Co.



It presents for the first time in history a simple and exact method of measuring screws and worms with wires.

It tells how to measure gears, splines and involute serrations It is an accepted

reference book for measuring problems and methods.

Copies free upon request.

THE Van Keuren Light Wave Micrometer is an instrument of exceptional merit, proven over a period of 15 years. It has enabled hundreds of High School boys and girls to produce and inspect parts to "Hundred Thousandths" of

The New 0 to 3" Light Wave Micrometer has a 1/2" diameter, 40 threads per inch micrometer screw, which can be made with greater accuracy and which has 3 times the wearing surface of an ordinary micrometer screw. It has an 8" diameter micrometer wheel, with .0001" graduations 1/10" apart. It has a non parallax, vernier index which enables readings to be made to .00001". It has an index lock. It has carboloy tipped anvil and spindle. It is a sturdy, yet sensitive instrument which weighs 17 pounds. It is a portable measuring machine, built for "Sustained Accuracy."

The Light Wave Micrometer is not a comparator. No gage blocks are needed and no errors creep in from worn blocks. It is a direct source of dependable precision—fast, accurate and profitable.

175 WALTHAM STREET, WATERTOWN, MASS. Light Wave Equipment . Light Wave Micrometers . Gage Blacks . Taper Insert Plug Gages • Wire Type Plug Gages • Measuring Wires • Thread Measuring Wires • Gear Measuring System • Shop Lian-gles • Carboloy Plug Gages • Carboloy Measuring Wires 31st Year

# KEEP YOUR EYES



HALLOWELL

### SHOP EQUIPMENT OF STEEL

Latest developments in plant, design, and techniques at SPS are producing an improved line of Shop Equipment. The products shown are only two of the many HALLOWELL items now being manufactured.

Write for descriptive literature.



The popular new HALLOWELL "CARRY-TOOL" of Steel.

Work Benches Foreman's Desks Tool Stands Platform Trucks

Posture Stools
Posture Chairs
Cabinets
Folding Tables



STANDARD PRESSED STEEL CO.

JENKINTOWN 22. PENNSYLVANIA

# For FASTER Production Milling... The NEW MILLING HEAD THE TOOL POINT CAPACITY up to 50 h. p.

Rigidity is needed at the tool point, and the new M. & M. milling head meets this requirement more than amply. Massive, balanced construction prevents vibration, permits heavier cuts and faster feeds, which result in

increased production and longer tool life. This new head can be adapted to special production milling machines of our design, which may also combine additional operations into transfer type or trunnion type machines.

Our representative will help you with your problems - no obligation.

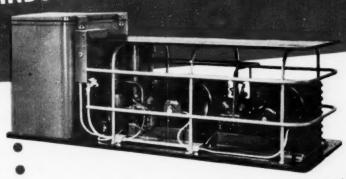
Manufactured by.

THE MOTCH & MERRYWEATHER MACHINERY COMPANY
715 PENTON BUILDING • CLEVELAND 13, OHIO

Builders of Circular Sawing Equipment, Production Milling, Automatic and Special Machines



# PRESENTING SUB-ZERO CASCADE INDUSTRIAL CHILLING MACHINE



- This new Sub-Zero Cascade Industrial Chilling Machine Model R-120 has been designed with chilling capacity for high production metal chilling of any part where large quantities of heat must be removed fast. This unit can reach temperatures as low as —120° F. and has the
- capacity at these temperatures to remove 2000 B.T.U.'s per hour. The machine's flexibility makes it adaptable to almost any metal chilloing job, including high production chilling. It is equipped with two com-
- pressors and a temperature control adjustable from 0° to -120° F. ● A chilling chamber 18" wide x 33" deep x 30" long provides a capacity
- in excess of 75 gallons or approximately 10 cubic feet. Write today for facts and information and learn of the many applica-
- Otions to which sub-zero industrial chilling can work for you. Dealer inquiries invited.

SUB-ZERO PRODUCTS DIVISION

Deepfreeze Distributing Corp. READING ROAD



PRESS-RITE POWER PRESSES

ARE BUILT IN SIZES

FROM 5 TO 85 TON!

\*NOW...a completely new one piece gap frame, with two tie rods built in give you extra strength, rigidity and insured extra tonnage at NO EXTRA COST. EXCLUSIVE on Press Rite Power Presses.

**DON'T DELAY...** This Press was recently shown at the ASTE EXPOSITION!

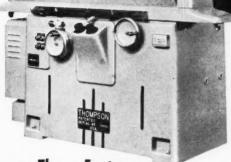
... WRITE FOR COMPLETE DETAILS NOW!

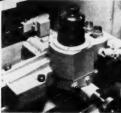


# Announcing The New Thompson Type 2F SUPER PRECISION

Tool Room Grinder

COMPARE
THIS NEW
THIS NEW
THOU ROOM GRINDER
TOOL ROOM GRINDER
TOOL ROOM GRINDER
TOOL ROOM GRINDER





MAGNIFIED TEMPLATE DIAMOND WHIFL DRESSER with ten to one magnification available in universal manually operated and electric. Other auxiliary Thompson Type 2F equipment includes "Coolan Thru the Wheel' learner and Magnetic Chucks with control."

### Compare These Features:

- HARDENED AND GROUND cross slide ways completely sealed.
- One shot lubrication to cross slide ways and internal saddle bearings.
   HARDENED, AND, GROUND, sealed, anti-friction.
- HARDENED AND GROUND sealed anti-friction vertical slide.
- HARDENED AND GROUND BED WAYS with automatic lubrication.
- 3600/1800 Ř.P.M. 2 speed wheel head. Heavy alloy steel spindle heat treated, runs in super precision ball bearings accurately preloaded, lifetime lubricated.

- · Handy control panel.
- · Elevation micrometer stop graduated in .0001".
- · GROUND THREAD FEED SCREW.
- · Automatic wheel TRUING device.
  - · Longitudinal hand wheel with automatic engagement.
- Hydraulic head movement throttle with rapid traverse.
- · Hydraulic table movement throttle.
- Elevating hand wheel graduated in .0005".
- GROUND THREAD FEED SCREW.

WRITE TODAY for complete specifications and performance data. Address Dept. 10, Thompson Grinder Co., Springfield, Ohio.

The only manufacturer of a complete range of heavy duty and light duty surface and contour grinders for industry.

Thompson
SURFACE
Grinders

The Thompson Grinder Company, Springfield, Ohio

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# VERS-0-TOOL-THE STANDARD

FOR THIS CLASS OF WORK At Addressograph-Multigraph



# VERS-O-TOOL FEATURES

quick opening action are characteristics of DBS die heads, built especially for Brown & 1 Threading close to shoulders and positive

2 Circular chasers are always up to correct position—assuring precision threads and

Vers-O.Tool circular chasers are regrind-3 Accuracy of thread form is assured through. out the life of a circular chaser, by means of direct micrometer check after each regrind. smooth finish.

able in a full range of thread sizes—even 5 Circular ground thread chasers are available through a full 270°—an exclusive feature,

down to 260 TPI.



tities of threaded parts that flow from their battery of more In the modern Addressograph-Multigraph plant at Cleveland, Style DBS Vers-O-Tools are used exclusively for the vast quanthan 60 Brown & Sharpe Automatics.

Here's why: the parts produced are largely adjustment-making screws used on their products. Thread uniformity and smooth finish are extremely important—there's no room for gradual deterioration of quality toward the end of the lot.

That's where Vers-O-Tools shine. Addressograph-Multigraph find they get 7,000 to 10,000 precision threads per chaser grind. But that's only part of the story. Lower chaser costs, less tool inventory, faster production-all of these enter in. For complete details on how Vers-O-Tools can cut threading costs in your shop, ask for catalog D-49.

# he NATIONAL ACME CO

CLEVELAND 8, OHIO IZO EAST 131st STREET .

Dindle - Hydra faps-The Chronolog-Lir uges - Contract | Wes - V

# How To Save Time IN YOUR MILLING DEPARTMENT WITH A SUNDSTRAND GENERAL PURPOSE MAGNETIC FIXTURE

Here's a new work-holding fixture for general purpose milling work. It saves on miscellaneous milling jobs by eliminating time losses for adjusting mechanical clamps and the cost of special jigs or fixtures. It is a complete unit with Sundstrand Magnetic Chucks mounted on an adjustable fixture. Chucks are quickly positioned as required by the size of work piece and easily adjusted for angular milling cuts. If you have miscellaneous milling jobs requiring frequent changeover from one part or cut to another, it will pay you to





### TYPICAL SET-UPS

These three set-ups illustrate only three of many different parts that are being run over one general purpose magnetic fixture in the manufacturer's plant.



Top — Milling steel tool blocks. Parts are run in lots of one to ten and are machined all over.

Center - Milling three steel



cam bars simultaneously.
Bars are 33% long x 2½ wide and 1½ thick and are milled all over in six operations.

Bottom — Milling cast iron motor bracket slide. Part is held for eight different cuts with same fixture. Sundstrand Magnetic Fixture showing adjustments. Note clamping is performed by merely throwing switch.

investigate the savings possible with this new magnetic holding fixture. Sundstrand Magnetic Chucks are operated with an automatic demagnetizing control. There is no tube in rectifier to burn out. Generally, the input of the control unit is 110 volt A.C., which is rectified to 6 volt D.C., which in turn energizes the chuck. The low voltage eliminates possibility of shock to the operator, and no heat is produced to affect accuracy. Controls with inputs other than 110 volt A.C. can be furnished when required.

### FREE Additional Data

Complete information on Sundstrand Magnetic Chucks Will be sent on request. Ask for bulletin 596 M.



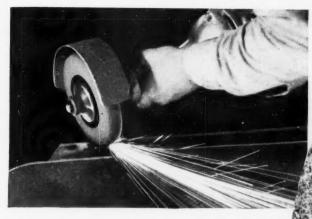




SUNDSTRAND MAGNETIC PRODUCTS CO.

1306 18th AVENUE . ROCKFORD, ILLINOIS

CHUCKS



Vibration Absorbing Rubber Bushing

EASE STRAIN on Wrists and Arms and BOOST PRODUCTION with MANHATTAN V.D.B. WHEELS on Portable Grinders

Reduce worker fatigue and you speed production and improve workmanship. Manhattan Abrasive Wheel Engineers have developed a great contribution to your grinding economy in the Manhattan V.D.B. Wheel. "V.D.B." stands for Vibration Dampener Bushing. (Pat. No. 2,187,350) This is a center core of rubber that absorbs shock and vibration in high speed hand grinders. It saves wear and tear on man and machine.

A typical user test showed that abrasive wheels equipped with the Manhattan Vibration Dampener Bushing enabled a man to perform the equivalent of 10 hours production in a regular 8-hour shift.

For better, faster grinding at lower cost, you can't equal Manhattan V.D.B. Wheels at any price. Bushing and wheel are sold as a unit in straight types up to 8" diameter. Rely on your Manhattan Abrasive Wheel Engineer. His suggestions make dollars and sense . . .

ABRASIVE WHEEL DEPARTMENT



PASSAIC, NEW JERSEY
RAYBESTOS MANHATTAN, INC., Manufacturers of Brake Linings • Brake Blocks
Clutch Facings • Radiator Hose • Fan Belts • Mechanical Rubber Products
Rubber Covered Equipment • Packings • Asbestos Textiles • Bowling Balls Powdered Metal Products Abrasive and Diamond Wheels

### LET'S FACE IT . . .





# All lathe jobs <u>don't</u> require steel-body chucks

Horton announces a new line of semi-steel-body chucks, for direct mounting on American Standard Spindle Noses, like those illustrated above. These chucks must meet the same rigid specifications for accuracy as Horton's forged-steel-body chucks. The jaws, scroll, and operating screws are forged steel; only the body is semi-steel. Horton engineers designed this new line for machines that do not require the extra strength of a forged-steel body. Perhaps your production line doesn't call for steel-body chucks . . . then why go on paying for what you can't use? You can cut costs now with Horton's new semi-steel line.

Call your local distributor, or write for new catalog sheets.

distributor, or the E. HORTON & SON Co.

WINDSOR LOCKS . CONNECTICU





MAN-AU-TROL VERTICAL TURRET LATHES

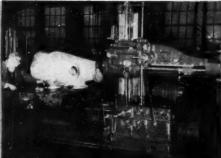
## CAR WHEEL WORK

Ask for Bulletin Automatic Machining of Car Wheels

### BULLARD Universal

HORIZONTAL BORING MILL JOBS

> Performance Plus Utility





### CUT MASTER

VERTICAL TURRET LATHES IN 6 SIZES 30 INCH TO 74 INCH

For Nearly any Railroad Job. Assured Accuracy at Lower Cost.

THE BULLARD COMPANY
BRIDGEPORT 2, CONNECTICUT

### YOU CAN'T BEAT FULMER HONING



- THE FASTEST, most efficient and easiest method of finishing cylindrical bores 1/2" to 30" diam.
- FAST STOCK REMOVAL: It is the common practice for stocks of .015"-.060" to be removed in a fraction of the time required to set up the job for boring.
- **EXTREME ACCURACY:** Hold to ±.0001" tolerance on bore size, straightness, roundness, with any surface finish desired.
- **ENGINEERED** to give maximum production with minimum investment, Fulmer Honing Machines offer the greatest value in the honing field. Get full details today.

Fulmer Model 15-48 honing 121/2"x42" Diesel liner. .012" - .015" of Gun Iron is removed in 10-12 min. Machine capacity: 2"-15" diam.

FULMER COMPANY NOW EXCLUSIVE U. S. DISTRIBUTOR FOR ALEXANDER **BALL HONING TOOLS** 

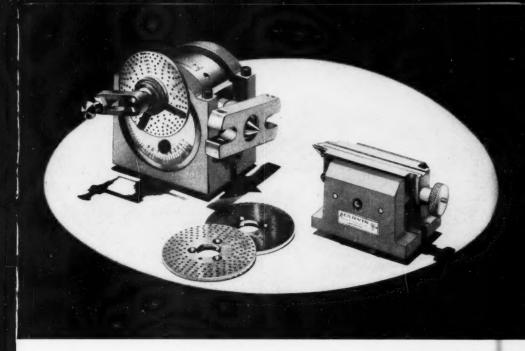
Available in sizes from 1/2" to 50" diam.

 WRITE FOR NEW 12 PAGE HONING BULLETIN.

Fully illustrated. Gives valuable data on honing applications, Alexander Ball Honing Tools, and specifications on all models of Fulmer Honing Machines.



C. ALLEN FULMER CO., 1233 First National Bank Bldg., Cincinnati 2, Ohio



# MARVIN PRECISION DIVIDING HEAD

A New Dividing Head made to the exacting precision standards of Marvin Tool Makers. Designed for dividing operations required in gear cutting, layout, splines, fluting taps or reamers, cams, hex screws and squaring shafts. The unit comes complete with 3 index plates, each plate having 6 sets of holes. It will tilt from 5 degrees below horizontal axis to 30 degrees past vertical axis. Total 125 degrees. The complete dividing head weighs 15 lbs. Tail stock has two pins, which align it in a horizontal position with the head stock. It is vertically adjustable for tapered work. Head has 40:1 ratio. Tail center travel is one inch. Spindle nose No. 2 Morse taper socket and 1"-10 threads. Rugged head and tail stock. Head is carried on two heavy trunnions.

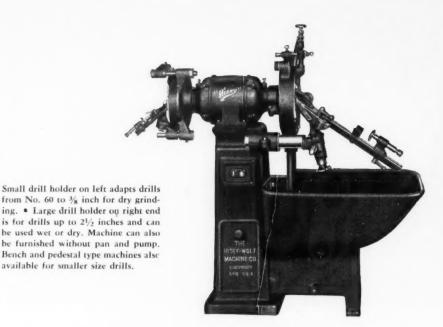
Priced at \$9950

Marvin precision materially reduces production costs.

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### Drills MUST be Sharp and Correctly Ground!

Drills that are sharp and correctly ground will (1) drill to exact size, (2) drill faster, (3) drill more holes per grind, (4) drill the same with each lip, (5) require less power to drill, (6) reduce breakage, (7) cost less to regrind and increase the life of drill by removing less metal when grinding. "HISEY" Drill Grinders are designed to grind drills correctly and quickly with inexperienced operators.



### ASK FOR CATALOG 71 MB

Other "HISEY" Products: Bench and Pedestal Grinders and Buffers, Snagging Grinders, Lathe type Grinders, Wet Tool Grinders and Disc Grinders.





# How to make your machines Sing ... for a Song

SWITCH TO CIMCOOL°, and listen to your machines humming in smooth, fast harmony. Then watch for an important scaling down of metal cutting costs. For this revolutionary cutting fluid—this <u>chemical</u> <u>emulsion</u>—saves you money three important ways:

- CIMCOOL INCREASES TOOL LIFE (and thus reduces down time) because of its chemical lubricity.
- FASTER SPEEDS are possible because Cimcool cools faster, through a unique physical change in the cutting fluid itself.

  Tools and chips actually stay cool to the touch.
  - CIMCOOL COSTS LESS than old-fashioned cutting fluids because it lasts longer. It also cuts cost of cleaning and changing. It virtually eliminates rancidity and foul odors. And because of its low surface tension and low adhesion to work and chips, there is practically no carry off.

Write for free booklet, "CIMCOOL Gives the Answers." Address, Sales Manager, CIMCOOL Division, The Cincinnati Milling Machine Company, Cincinnati 9, Ohio.

°Trade Mark Reg. U.S. Pat. Off.

A Production-Proved
Product of
THE CINCINNATI MILLING
MACHINE CO.

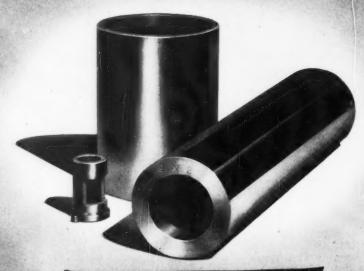


62 B

OF ALL METAL CUTTING JOBS

Buckeye





STANDARD STOCK BEARINGS

FULLY MACHINED BARS

SPECIAL BEARINGS

Producing millions of standard and special bronze bearings for thousands of power transmission applications has taught us a lot about bronze, the ideal bearing metal. Our specialized service to America's Industries for nearly a half century, enables us to offer highest quality bearing bronze at a cost made possible only by latest production methods. Do you have a special bearing problem? The Buckeye Brass and Manufacturing Company, 6410 Hawthorne Avenue, Cleveland 3, Ohio.

BEARING BRONZE



### with SPEED-WET METALITE' CLOTH BELTS

Finishing with Behr-Manning belts and engineering advice pays off, as this case demonstrates. These cold rolled steel car visor ends were being finished at the rate of only 12 to 15 pieces per belt until the Behr-Manning Fieldman came in and demonstrated how SPEED-WET METALITE Cloth Belts could do the job at a terrific saving. Now using rugged, heavy-duty, all-resin bonded SPEED-WET METALITE Cloth Belts, pieces are rolling off the line at a rate of 40 to 60 per belt.

How about your finishing and polishing operations? Whatever the material or shape, Behr-Manning belt methods may be able to boost your output and slash costs. Let one of our field engineers give your work the "belt test" in your own plant or in the nearest Behr-Manning completely equipped local demonstration room. Check with us about this now.

### GET THIS NEW BULLETIN

Here's the latest about belt finishing and polishing. It's "loaded" with illustrations and helpful data. Write today for your copy to Dept. MS-550.





### ANNOUNCES

a complete new line of

### SOLID ONE-PIECE Steel Frame

Presses

Straight Side, Double Crank

### MANUFACTURERS OF

Presses, Shears, Machines and Tools for Plate and Sheet Metal Work.

Made in sizes up to the maximum that can be shipped on a freight car. (Larger sizes are four-piece tie rod construction).

Furnished with Niagara Air Actuated, Electrically Controlled Sleeve Clutch on sizes up to 61/2" shaft. Plain or single geared, single end drive.

Furnished with Niagara Pneumatic Friction Clutch on sizes 41/2" to 12" shaft. Single geared or double geared, single, end or twin drive.

Made in lengths up to 96" between gibs. (Longer lengths are tie rod frame con-

Niagara Pneumatic drawing cushions available.

Write for specifications on sizes to fit your requirements.

NIAGARA MACHINE AND TOOL WORKS,

NIAGARA NE ESE

### No. 69-E PRESS

One piece welded steel frame

Single geared

Air actuated, electrically controlled sleeve clutch

Pneumatic drawing cushions

72" between gibs

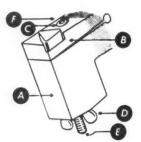
Bottom stroke capacity 189 tons

**BUFFALO 11, NEW YORK** 

District Offices: Detroit, Cleveland, New York

# NEW chrome plated HOLDERS - UP TO 500% MORE LIFE





Selected alloy steel, heat treated, and hard chrome plated, combined with quality SUPER workmanship gives you a holder that resists distortion and scoring. The broached holes fully enclose and support the carbide inserts. No separate parts or clamping devices to become lost or to cause other complications.

# IMPROVED Estate Tool DESIGNS

- A. Hard chrome plate gives up to 500% longer wear by eliminating chip erosion.
- B. New clamping device gives controlled locking and stress-free carbide insert support.
- C. Easily accessible clamp locking screw for fast and easy blade interchange.
- D. Wing nut locks adjusting screw. No wrench required.
- E. Knock-out hole for easy carbide insert removal.
- F. No offsets nor excessive overhangs. Permits adjacent set-up of holders.

Write for our new catalog.

SUPER
TOOL COMPANY
21650 HOOVER ROAD
DETROIT 13, MICHIGAN

### SELLERS DRILL GRINDERS

Longer drill life . . . More holes per grind ... Increased savings in drill cost ...

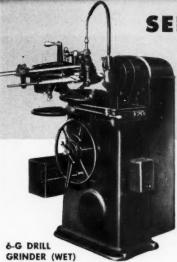
Reduced drill inventory



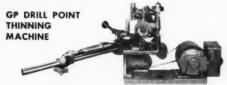
automatically produces the scientifically correct drill point required for precision work. Angles of inclination are equal, contour of lips is identical, resulting in a point that drills cylindrical holes faster with more holes per grind.

4-G DRILL GRINDER (DRY)

For arinding right hand 2 and 4 lip twist drills from 1/4" to 2" diameter, 3 lip drills from 34" to 2%" diameter.



For grinding right hand 2 and 4 lip twist drills from 5/4" to 3" diameter, 3 lip drills 34" to 2%6" diameter.



Thins and centers standard 2 lip twist drills from 1/2" to 3" diameter up to 24" in length.

> Among Heavy Machine Tools built by Consolidated are

> > LATHES

BORING MILLS DRIL PRESSES MALING MACHINES BORING MACHINES COLD SAW MACHINES BORING, DEILING AND MILING MACHINES DEAL AND TOOL PLANERS SLOTTERS RAHROAD SHOP TOOLS AUTOMOTIVE TOOLS AND OTHER SPECIAL MACHINES

Send us six or more of your own twist drills to be ground on Sellers Grinders. Try them against any other grinding on your own work. Compare drilling speed, quality of holes, number of holes per grind. Find out the truth about drill grinding. There is no obligation.

Full information covering any Sellers Drill Grinder in which you are interested will be furnished upon request.

Grinds straight or taper shank right hand 2 lip twist drills from .028" (No. 70) up to 1" diameter to any included angle of point from 80° to 160°.

BUILDERS OF HEAVY DUTY MACHINE TOOLS SINCE 1848

1-G DRILL

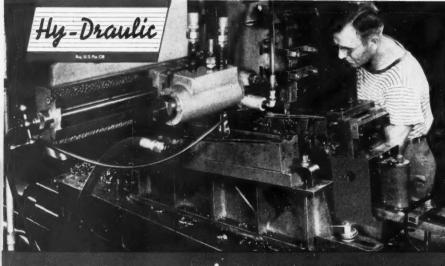
GRINDER (DRY)

BETTS . BETTS-BRIDGEFORD . COLBURN . HILLES & JONES . MODERN . NEWTON . SELLERS

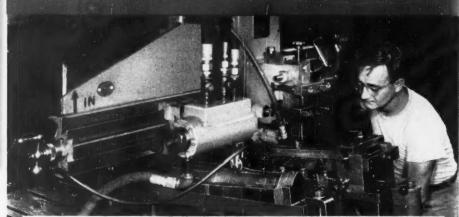


MACHINE TOOL CORPORATION

ROCHESTER 10, NEW YORK



# Here are the machines



For faster production, Allis-Chalmers machined these steam turbine spindle blades from rough forgings on Rockford Hy-Draulic Shaper-Planers equipped with Rockford Hy-Draulic Duplicators.

First set-up (above) produces concave form on inner face . . . second set-up (below) convex form on outside face. Tolerances held ± .002".

DURING RECENT MONTHS the tremendous economies made possible by the Rockford Hy-Draulic Duplicator have been proved over and over again. In die making, even though a part may be made only once, time and money are saved. Plaster or wood patterns may be used for duplicating non-repeated parts, or for preparing durable metal patterns for production parts.

Duplication, by the Rockford method, is as rapid as any type of shaper or planer work . . . and accurate to the thousandth of an inch. The Rockford Duplicator, being hydraulically actuated, transfers all movement of the follower directly to the tool head, with no secondary movement to reduce speed or cause inaccuracies.

... and the facts

### CHECK THESE ADVANTAGES:

- Hydraulically actuated for speed and accuracy.
- · Saves tremendous time and cost.
- Tracer contacts pattern on cutting stroke only . . permitting faster returns, saving wear on patterns and tools, allowing the use of carbides.
- · Operates at any desired cutting speed.
- · Extremely light stylus or tracer pressure.
- · Head and tool lift lock if power fails.
- · Hydraulically counter-balanced tool head,
- · Available for all Rockford Hy-Draulic 36" Openside Shapers, Planers and Shaper-Planers.
- · Made by ROCKFORD MACHINE TOOL CO., builder of Hy-Draulic machine tools since 1929.

Write for complete information to:

### ROCKFORD MACHINE TOOL CO.

2500 Kishwaukee Street Rockford, Illinois

> ● Low Cost ● Contour Machining Accurate

### **ROCKFORD Hy-Draulic DUPLICAT**





### MACHINE FOR TAPPING 4 DIFFERENT PARTS

THIS machine, incorporating 4 standard Model "KT" Govro-Nelson Tapping Units, is so designed that the units can be repositioned to perform tapping operations on 4 different parts, tapping 2 to 4 holes simultaneously in each part.

If you have a number of parts requiring drilling or tapping of small holes, quite possibly a single machine incorporating these self-contained units could be designed that would handle all parts with simple rearrangement of the units. The result would be a special machine for each of the parts, with the cost spread over the production of all the parts.

Let us show you how you can cut the cost of your drilling and tapping operations. Send us samples or part prints and we shall be glad to recommend the proper units or quote on a complete set-up. Literature sent upon request.



### GOVRO-NELSON CO.

Machinists of Precision Parts for 27 Years

1933 Antoinette, Detroit 8, Mich.

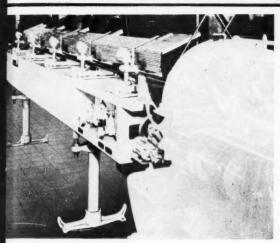
Automatic DRILLING UNIT



### LIPE Fully Automatic

### MAGAZINE LOADING PNEUMATIC BAR FEEDS

Increase Screw Machine Output Up 70 60% or More



MODEL AML BAR FEEDS FOR B & S SCREW MACHINES HANDLE FULL CAPACITY OF ANY MACHINES TO WHICH BAR FEED IS ATTACHED.

(Model Determined by Spindle Bore of Machine)

AML 56 for B & S No. 00 Spindle Bore 1/4"

AML 68 for B & S No. 00 Spindle Bore 1/4"

AML 87 for B & S No. 0 Spindle Bore 7/8"

AML 100 for B & S No. 0 Spindle Bore 1/4"

Restocking time replacing bar in spindle	4 sec.
Time to load magazine per bar (2 to 3 mins. for full magazine)	1/2 to 1 sec.
Piece length per one feed-out or collet of	pening 0" to 16"
Stock capacity (dia.) #0 B & S	
Stock capacity (dia.) #00 B & S	/8" to ½" dia
Magazine capacity 19 - 5%" I	pars 96 - 1/8" bars
Time per one feed-out or collet opening	.2 to .5 sec.
Feed cylinder air pressure	18# to 35# P.S.I
Installation time	6 hrs. to 8 hrs.
Set-up time, bar feed unit only	5 min. to 15 min.
Number of machines per operator	Up to 8 or 10



### MAGAZINE HOLDS NORMAL 8-HOUR DAY RUN OF STOCK

Magazine can be loaded with stock bars ranging in number from nineteen  $\frac{5}{8}$ " bars to ninety-six  $\frac{1}{8}$ " bars. By actual time study...time required to load magazine from nearby stockpile ranges from 80 seconds to 114 seconds... average time 100 seconds. It's just a matter of minutes to change from one size stock to another.



Lipe - ROLLWAY CORPORATION
Syracuse 1, N. Y. Cable Address LIPEGEAR

### LEADERS IN INDUSTRY MARK WITH NOBLEWEST



How a leading manufacturer produced a new type of permanent numbering wheel by using Noblewest

# Roll-O-Matic

### DEBOSSING

THE PROBLEM—To produce metal number wheels with permanent numbers indented below the surface of the wheels so that they couldn't wear off. They also had to be easier to read—and most important—they had to be produced in large quantity.

**THE SOLUTION**—Noblewest marking specialists were called in. The result was this high speed Model No. 297 Roll-O-Matic debossing machine that produces the desired indented numerals at production speeds up to 600 wheels per hour. This machine can be tooled for making raised (embossed) impressions as well as indented (debossed) impressions on practically any type of circular thin-walled metal product. For full information write The Noble & Westbrook Manufacturing Co., 25 Westbrook Street, East Hartford 8, Conn.

Illustrated at right — collapsible type embossing die that allows wheels to be easily removed after debossing—also, wheel showing numbers permanently indented below surface.







FLEX-RITE REAMERS give greater accuracy, lower costs, higher production rates because unique blade-expansion feature permits repeated sharpenings without reducing original size.

WRITE FOR SPECIFICATIONS AND PRICES.



FLUTED CHUCKING REAMERS... spiral and straight flutes... choice of straight or taper shanks... high speed steel.

# Now...with FLEX-RITE the line of Butterfield 100% Inspected Reamers is Complete

ALL DESCRIPTION OF THE PARTY OF

TAPER PIN REAMERS . . . taper  $\frac{1}{4}$  in. per ft.... Straight and spiral flutes in carbon or high speed steel. Helical flutes in high speed steel.



HAND REAMERS . . . straight or spiral flutes which are slightly tapered on end and cleared to edge...carbon or high speed steel. Also expansion type in carbon steel only.



CENTER REAMERS AND COUNTER-SINKS . . . 60° and 82° included angle . . . all regular in carbon or high speed steel,



STUB SCREW MACHINE REAMERS...
high speed steel...regular with right hand
cut and left hand spiral flutes. Reamers
with left hand cut and right hand spiral
flutes are special.

BUTTERFIELD DIVISION

Derby Line, Vermont

Looking forward to seeing you at Booth No. 705, Industrial Supply Convention, Atlantic City, May 22-23-24 BUTTERFIELD

THE 100% INSPECTED TOOLS

Every Tool Individually Inspected
TAPS - DIES - REAMERS - SCREW PLATES



### Torit FB Type Dust Separator



These units are designed to handle large volumes of dust, yet permit the cleaned air to be recirculated into the room. In operation most of the dust is precipitated within the cyclone unit, while the residue is captured by the after-filter bag. Five sizes, from ½ to 5 H.P. are available.

### TORIT DUST COLLECTORS double up to cut costs in this grinding room

This installation started with one Torit No. 81 Dust Collector serving two surface grinders. Economies from this set up were so great that the company bought three more Torit Dust Collectors to replace the wet type central suction system previously used in this grinding room.

Compact and completely self-contained, Torit Dust Collectors fit neatly into present and future production layouts. Set close to the machine and operated simultaneously, they combine top efficiency with low power consumption.

Torit Dust Collectors for all standard grinding, polishing and cut-off machines are carried in stock. Special adaptations can be quickly made. For complete details, and the latest Torit catalog, write:



Manufacturing Co. 296 Walnut St. St. Paul 2, Minn.



For Brightboy's position as leader in rubber-bonded abrasives, its makers thank all concerned in production operations in America's metalworking, woodworking and plastics industries who "know their abrasives" and use them. Through Brightboy applications, its cost and methods - conscious users have achieved most in savings and performance, burring, cleaning, finishing and polishing in one operation.

### WHAT Abrasive-Plus-Rubber BRIGHTBOY DOES:

- 1. Bridges the gap between the rough grind and the buff, frequently in one operation.
- 2. Works to close tolerances; can be shaped to contour.
- 3. Produces a wide variety of conventional and special finishes and patterns; frequently the final polish.

4. Requires no beforeuse preparation or dressing no skilled labor to





Not until you've used Brightboy can you appreciate its unique, original, smoothsurfacing action that only perfect blending of abrasive and rubber can give in finishing metals, wood, plastics and glass. Test Brightboy in comparison with the methods and materials you're now using. You may save as much as 50% in production time!

ASK YOUR DEALER NOW for the Brightboy catalog-manual, which lists many timesaving suggestions in production procedure. Write the Brightboy Service Department on any production or methods problem where finishing is involved.

BRIGHTBOY INDUSTRIAL DIVISION WELDON ROBERTS RUBBER CO., Newark 7, N. J.

> America's Pioneer Manufacturers of Rubber-Bonded Abrasives





Skinner machine vises are built with tool-makers' accuracy with many unique features to assure quick action, positive gripping and long life. They are profitable additions to your oldest or newest machine tool equipment.

Series DPV wrench-operated Vises have semi-steel body and hardened and ground work holding surfaces. They have all the universal features so necessary for drill press operations. Clamp the work for drilling in one plane — drill — turn the vise on edge for all right angle drilling operations.

Series FS Vises have swivel base for accurate indexing necessary in milling operations. Top of the movable jaw is ground parallel to the base for use as an indicating base for setting cutters, trueing work, etc.

Details on the complete line of Skinner Vises are contained in Catalog No. 61.

Write for free copy,





THE CRES

SERIES FS Sizes 5" to 8"

The Skinner Chuck Co. 340 CHURCH STREET, NEW BRITAIN, CONN.



NEW engineering designs give greater precision, rigidity and production capacity.

NEW control applications result in greater operating ease and efficiency.

NEW combinations of modern lubrication methods combat wear and reduce operating costs.

### THE SPRINGFIELD MACHINE TOOL COMPANY

SPRINGFIELD, ONIO, U.S. A.

GENERAL DISTRIBUTORS: BRYANT MACHINERY & ENGINEERING COMPANY, 400 WEST MADISON ST., CHICAGO & Exclusive Representatives in All Principal Cities AMAZING! INTRELIEVABLE!

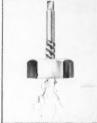
**NEW INVENTION** 

# the SHEARCUT THREAD-CUTTING BROACH

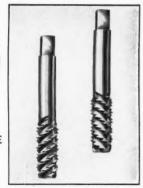
FORMS THREADS BY THE NEW SHEARCUTTING TECHNIQUE



Broaching threads in a blind hole. Note the continuous one piece curled chips being fed out of hole.



Broaching threads in through holes. Note the curled chips being removed in front of broach.



Note the True Shearcutting Faces

SAVE - SAVE - SAVE - SAVE

REPLACE YOUR TAPS WITH THREAD-CUTTING BROACHES

Patent Warning
All Shearcutter Tools are protected
by United States and Foreign Patents,
received, pending, or applied for.

### THREAD CUTTING BROACHES DELIVER THESE REMARKABLE ADVANTAGES:

- · End tapping trouble.
- Produce perfect threaded holes by a true Shearcutting Broaching action.
- · Are practically unbreakable.
- Ground from hardened high-speed solid blanks.
- Require only one-half the power required for tapping.
- · Work equally well in all materials.
- . Do not bind or seize in the hole.

- · Have an amazing long life.
- May be resharpened many times.
- Tend to be self sharpening.
- Do not tear the material being cut.
- · Feed the chips out of the hole.
- Lower production costs.
- Replace standard taps in most sizes.
- · Lower scrapped parts.
- Lower Power requirements.
- · Lower tool cost per threaded hole.

SHEARCUT TOOL COMPANY
BOX 746 · RESEDA, CALIFORNIA

...it's job tested!



### can cut your costs!

Job tested—in tool and die shops; in grinding, polishing, filing and similar operations. Factory experiences prove that Haskins flexible shaft equipment can step up production, cut costs, in a hurry. For this equipment has all the power and dependable, constant speed needed to turn out more work, better work—faster and easier, with longer trouble-free operation.

Profit-making advantages like these really pay off. Let a Haskins Engineer help you select the Haskins equipment that will do the job better in your plant. Consult your classified phone book for the Haskins Engineer nearest you or write to: R. G. Haskins Co., 2647 W. Harrison St., Chicago 12, Ill.



FLEXIBLE SHAFT EQUIPMENT



Chips can't stick in Simonds full-curved gullets. And each chip is broken in three pieces by Simonds design of alternating bevel and square teeth . . . so chips don't drag on kerf. And these Simonds Inserted Teeth . . . milled by special machines . . . are individually wedged in place to give added strength to the saw. See your Distributor today.









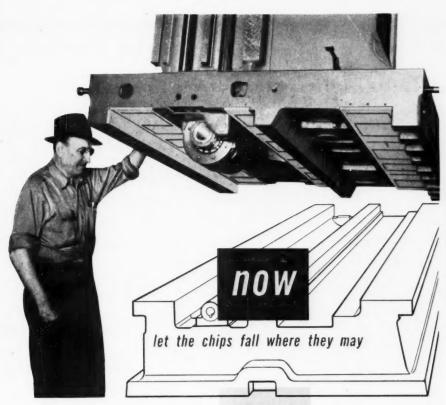




Branch Offices in Boston, Chicago, Los Angeles, San Francisco and Portland, Ore. Canadian Factory in Montreal, Que.



SIMONDS RED STREAK INSERTED-TOOTH SAWS



### CINCINNATI GILBERT'S

... extend service life far into the future.

Now Cincinnati Gilbert brings you nonmetallic way blocks between the column
base and the runway in Floor Type Horizontal Boring Machines. Field tests indicate that with average lubrication and
cleanliness this development extends
service life of the ways almost indefinitely. Wear is negligible and accuracy is
maintained . . This is just another of
many reasons for specifying "CINCINNATI GILBERT" on your next Horizontal Boring Mill purchase . . . The Cincinnati Gilbert Machine Tool Co., 3360
Beekman Street, Cincinnati 23, Ohio.

### new

NON-METALLIC WAYS

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### GILBERT

MACHINE TOOL COMPANY

RADIALS . HORIZONTAL BORING MILLS . ACCESSORIES

THOSE WHO BUY GILBERT BUY GILBERT AGAIN

### WICKMANS O

### WICKMAN SLIDING HEAD PRECISION AUTOMATICS

For high speed accurate production of long slender parts requiring extreme precision and fine finish. Multiple diameters, pivot points at one or both ends, back shoulders, tapers, bevels, etc.,

all are produced in a single operation, and attachments are available for drilling, chamfering, tapping, threading, slotting, etc., during the normal automatic cycle.

Made in two sizes, with turning capacities up to 4 mm. or 7 ".



CANADIAN INTERNATIONAL

### BOOTH

29th MAY

### WEBSTER & BENNETT VERTICAL BORING

The Webster and Bennett 48" boring mill is a general purpose machine of medium weight and high power relative to capacity. and full advantage can be taken of tungsten carbide tooling.

Column and base are in one piece providing maximum rigidity, and a powerful turret locking device binds the turret solid with the slide over its entire base for increased accuracy.

mills are available in sizes up to 60"

All sally 18 walls 114 11 mm

### AND TURNING MILLS

Hydraulic control is applied to the main driving clutch, self-compensating brake. rapid traverse and to the selection of feeds and speeds. A range of single and duplex



5 32" dia. mild steel, 0-603" long. Production time, 8 secs.

STEM CONTROL VALVE 3 8" dia. 0.3", carbon steel. 1.62" long. Production time.

POINTER CLOCKWORK

0-188" dia. brass, 0-625" long. Production time, 8} secs.

AGENTS IN U.S.A. TRIPLEX MACHINE TOOL CORPN. World Telegram Bldg. 125 Barclay St. NEW YORK

Except for Wickman Multi-Spindle Automatics

WICKMAN MULTI-SPINDLE AUTOMATICS

28 secs.

RYDERMATIC VERTICAL CHUCKING LATHES

MACNAMARA WIRE AND STRIP FORMING MACHINES

OTHER MACHINES ON

### COVENTRY, England



### WICKMAN OPTICAL PROFILE GRINDER

Designed for profile grinding to fine limits, this machine is especially suitable for producing profile gauges, flat or circular form tools, etc., in any material including tungsten carbide.

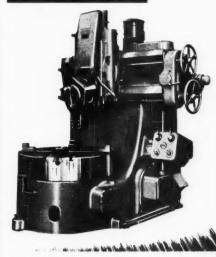
material including tungsten carbide. A form up to 5% long, and 24 deep can be ground in a workpiece 2"

thick.

TRADE FAIR - TORONTO

1103 - 1109

1116 - 1122 - 9th JUNE





B

FLAT FORM TOOL Tungsten carbide tip. Grinding time, 80 mins. Accuracy, -001".

S.

FORM TOOL for spark plugs. Tungsten carbide tip. Grinding time, 5½ hrs. Accuracy, -001".

CIRCULAR FORM TOOL

Grinding time, 1] hrs. Accuracy, -001".



FORM TOOL for spark plugs. Tungsten carbide tip. Grinding time, 5½ hrs. Accuracy, -001".

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Except for Ryder machines

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Benchmaster is universally accepted as the standard press for small capacity, high speed operations. It delivers more than 4 strokes per second, hits with 4 tons of punching pressure at each stroke. Ruggedly designed, precision built, your Benchmaster gives years of dependable serv-

ice on all types of materials and opera-

For punching, stamping, forming, riveting, trimming and countless other operations, do it faster and cheaper on a Benchmaster. Over 18,000 now in use in all parts of the world! Write Dept. MM for free folder!





Army and Navy Ordnance Plants now have Surface Quality Control Systems to assure complete understanding between Engineering, Production, Inspection, and Purchasing as to surfaces required on every part. Machine-cut SURFACE FINISH STANDARDS are the easy, economical, and positive means of carrying out such systems. With these comparator blocks you can control surface quality at a fingernail-touch and reduce production costs by specifying fine finishes only on surfaces that need them.

If you are doing Government work, if you are interested in producing better products at lower costs-control surface quality with machine-cut SURFACE FINISH STANDARDS. Specimens are marked in micro-inches and cover all

ordinary machine operations. Available in Pocket-Size Sets of 20 stainless steel specimens or Master Sets of 23 specimens.

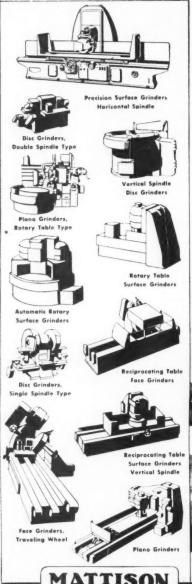
tions from this standard will be permissible only by authority of the Munitions Board Standards Agency."



Learn "Why Surface Quality Control Pays" Write today for Bulletin No. 1049 S







## MATTISON GRINDERS

### If its a Flat Surface to Grind There's a Mattison to Grind it.

● With the addition of the production grinding machinery formerly made by the Hanchett Manufacturing Company, Mattison now is in a position to work with you on all your surface, face and disc grinding problems. These machines are made in various types to handle a wide range of work. Experienced fixture engineers are available to give you best production efficiency with Mattison Machines.

For any flat grinding, ask for our recommendations on the proper method and machine for your job. No obligation, of course.

For catalog on all machines, ask for free copy of general bulletin.



40 hours before — new 4 hours. Pump case ground on Mattison Horizontal Spindle Pre-



320 surfaces of cast iron compression heads per hour, removing 1-32" stock with Mattiscin No. 24 Rotary Surface Grinder



900 connecting rods per hour, using 40 station fixture to finish grind crank and wrist gen end of assembled rod with Mattison No. 72 Grinder



Shows variety of work run on Mattison Face Grinders

MACHINE WORKS

ROCKFORD

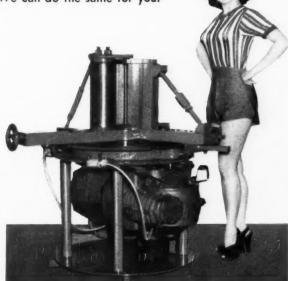
· ILLINOIS

# Do You WANT SHAPES?

### A Pedrick Production Bender Gets Them

● The Pedrick Bender shown is our Model A-5. It is being used to bend copper busbar and steel strips 12" wide by 1/4" thick to a square corner. This machine will also be used to bend channels and angles for a prominent government agency. This agency has a large number of Pedrick machines in operation, 7 all told, bought one after the other. A prominent private corporation has bought 34 over the past 10 years, and is now negotiating for 4 more. Anybody

can make a machine, but when a customer buys one and then comes back and buys another and so on, it is the best recommendation we can offer as to its value. We can do the same for you.



Write for Our Descriptive Folder

PEDRICK TOOL and MACHINE CO.

3643 N. Lawrence Street

Philadelphia 40, Pa.



# Our First Forty Years ...

We are celebrating our Fortieth Anniversary this year with some pride of accomplishment and with a good deal of gratitude to the people who have made this possible.

These include our thousands of friends throughout North America and beyond who have bought our diamonds and diamond products; our many suppliers whose cooperation is so essential, and our company "family" of workers in our several plants and field offices who make, distribute, and service our products.

We have seen this family grow from our original group of three beginners to an organization of nearly two hundred including many outstanding specialists. And, with them, we have graduated through the years from an unheated garage (with practically no equipment) to the most modern of plants and the finest of equipment, much of it exclusive.

Together, we have seen the diamond tool changed from a primitive, handy-man product to a thoroughly scientific tool "engineered to the job" in accordance with the principle which we pioneered forty years ago and developed into recognition throughout industry.

To all of these friends—customers, suppliers, co-workers our sincere thanks.

WHEEL TRUEING TOOL COMPANY

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Established 1910

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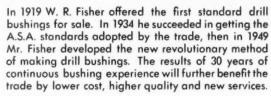
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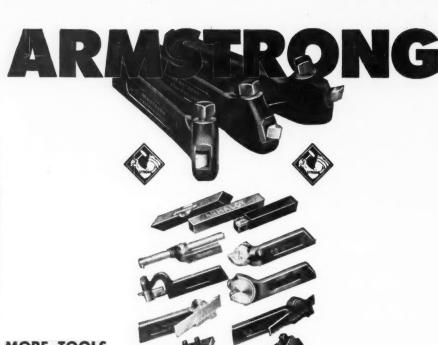
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# Machine Shop

MAY, 1950

Vol. 22, No. 12

#### Metallizing in the Machine Shop

By Gilbert C. Close les of application able for spraying

This article describes recently developed techniques of application and newly developed wires which are now available for spraying coatings that meet unusual physical and chemical requirements. Page 82.

#### High Quality, Low Cost Production Through Use of Power Tools

By Edmond C. Powers

Pride Manufacturing Company provides the locale of an interesting case study on the economy afforded by the use of air-operated tools. Page 94.

#### An Analysis of Bending and Forming Dies

By C. W. Hinman

Mr. Hinman discusses a method of "freezing" alloy dies, the control of hydraulic pressures when forming, the forming of corrugated sheets in press brakes, and the forming of various shapes in sidecam dies. Page 104.

#### **Simple Tooling Control Pays Dividends**

By H. G. Frommer

The control system described by Mr. Frommer emphasizes the importance of effecting full cooperation between all partaking departments and individuals without the sacrifice of speed, as well as providing permanent records and accurate cost figures for future reference. Page 118.

#### **Reducing Cost of Drophammer Dies**

By Frank Charity

Mr. Charity outlines the tooling techniques employed at Stainless Steel Products, Incorporated, for effecting the economy of drophammer production. Page 128.

#### Uncle Sam Would Like to do Business with You

By Robert M. Luckey

This article is of vital interest to manufacturers who are interested in bidding on both military and civilian procurement contracts of the U. S. Government. Page 146.

#### Large Volume Chip Removal System

By Graydon R. Mace

Mr. Mace describes the setup which enables the El Segundo plant of Douglas Aircraft to efficiently dispose of more than 65 tons of aluminum alloy chips during each eight hour shift. Page 160.

#### Sales Hints for the Smaller Shop

By Karl F. Kirchhofer

Presenting a combination sales plan which involves direct mail, telephone contact, space advertising, and personal contact. Page 164

#### Getting Set for Pensions—Your Problems and Policy

By William J. Casey

Mr. Casey presents clear-cut answers to some of the many questions that have been raised concerning the adoption of pension programs. Page 174.

#### Highlights of Papers Presented at ASTE Technical Sessions

For those who were unable to attend the ASTE meeting in Philadelphia last month, these brief resumes will be of particular interest.

# Metallizing In The Machine Shop

By GILBERT C. CLOSE

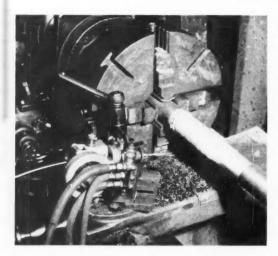
### In which the author discusses the advantages of the process and its wide application.

THE metallizing process, used prior to World War II mostly in isolated phases of heavy industry, gained prominence during the conflict as a stop-gap means of maintaining hard-to-replace shop equipment and, in some cases, for salvaging production parts that had been machined undersize. Sprayed metal coatings of aluminum and zinc were used also for corrosion prevention, replacing the more critical plating metals such as cadmium and chromium. As might be expected, this introduction of the process to industry

in general led to a sifting of its uses and retention of those uses with advantages superseding the advantages of other maintenance and reclamation processes. The applications of metallizing since World War II have been increasing along constructive lines, as have the techniques of application and metal wires available for spraying coatings of different physical and chemical requirements.

In general, metallizing is an economical process which can be quickly performed in the shop with shop per-

sonnel and equipment. In some cases a part can be rebuilt by metallizing without removing it from the machine. Metallizing can also be used on parts that are too large for conventional plating equipment, and on parts where the shape would obstruct the throwing power of a plating solution. Further-



Rebuilding a propeller shaft with corrosion - resistant Monel. Surface preparation was by rough thread-ing. Approximately 1/16 inch of spray-metal build-up remained after finish machining.

36,000-pound turbine shaft being salvaged by spraying with stainless steel. Note that shaft was not removed for this salvage operation.

more, the number of different metallizing wires available makes possible the use of a metal particularly adapted to the conditions under which the part must operate.

Perhaps the chief advantage of metallizing in the machine shop is its versatility. It can be used in rebuilding all types of circumferential wearing surfaces, internal or external, whether the wearing action is rotary or reciprocating. Shafts, journals, bearing surfaces, pistons, cylinder walls, impeller shafts, and similar parts fall under this category. Parts of this nature constitute a large majority of all wearing units and will utilize the greatest portion of metallizing applications. Restoration of press-fit dimensions on wheel and axle housings, bushing housings, ring gear mountings, gearboxes and wheel hubs is another important application of the process.

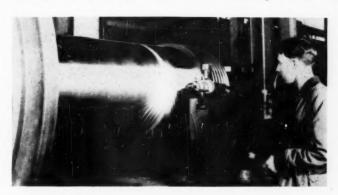
Less frequent applications of metallizing might include applying a dissimilar metal coating to aid in heat dissipation; use of sprayed metal to repair cracked motor blocks, water jackets or base mounts; rebabbitting bearings by spraying; and, in some



cases, application of a metallic coating on wood, glass, fabric, plastic or concrete.

As with all processes, metallizing has certain limitations that must be recognized for best results. One such limitation is the relatively low tensile strength of the sprayed metal. Metallizing should not be attempted where the sprayed coating will be subjected to tensile strains. Such a strain might develop on the outside arc of a part

subjected to considerable flexing during service. On the other hand, the sprayed metal has high compressive strength, and can be used with



Huge ram being rebuilt by coating with high carbon steel.

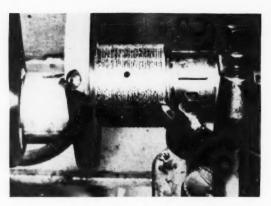
Rough threading a crankshaft journal. Tool is set to tear a thread rather than produce a smooth cut.

complete satisfaction in rebuilding worn shafts, bushings, bearings and journals which operate under extremely heavy service loads. Shear strength of the sprayed coating, when applied to large surfaces and properly bonded, will resist unusually heavy sliding friction loads.

In most cases adherence of the sprayed metal coating to the surface on which it is applied is by mechanical bond only. The surface of the part to be sprayed is first roughened by grit blasting, rough threading, or by fusing rough metal particles to it. The molten spray metal locks and hardens around these rough surface projections and keys the coating to the surface.

Grit blasting, using a size 30 or 40





steel grit, is generally employed for preparing large flat or irregular surfaces for the application of a corrosion preventive coating and is seldom used in machine shop work. Rough threading provides a good method of surface preparation on circular components or parts that can be mounted on a lathe. The cutting tool is set to tear rather than cut a smooth thread, and the resultant roughness provides ample keys for the sprayed coating.

A more recent development, called "fuse bonding," employs a special alloy electrode which is wiped across the surface to be sprayed. Current passing between the electrode and the part surface fuses off particles of the electrode and welds them to the surface. Heat generated by this process is so localized that it does not affect the temper of the part. These roughened particles then act as keys for the sprayed coating.

Recently, however, two methods of surface bonding have been developed that do not require initial surface preparation or roughening of the part. One method is called the Sprabond process, involves the use of a special alloy wire.

Metallizing a huge Diesel engine cylinder with high carbon steel.



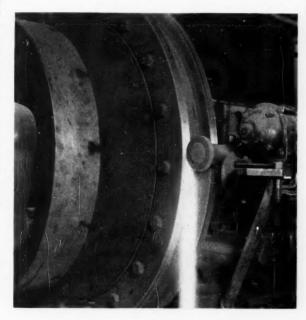
Flashweld die inserts salvaged by rebuilding with copper. The dies were first machined so that a relatively thick copper insert could be sprayed. Transverse, shallow cuts with a band saw provided keys to hold the spray-metal in place.

The part is first thoroughly cleaned but left smooth. The special alloy wire is then applied in thicknesses ranging between 0.0015 and 0.002 inch. Subsequently, the type of wire desired can be used for finishing the build-up. This method has been found particularly adaptable to such jobs as repairing cracked blocks and castings, coating flat surfaces, coating molds, patterns and matching plates, rebuilding lathe ways, and resizing inside diameters.

The second method, called the Sprayweld process, employs a special allow wire which may be sprayed on a

smooth, cleaned surface and then fused with the base metal with oxyacetylene, induction heating, or furnace equipment. This process has found wide use in various hard-facing jobs. The coating obtainable ranges in hardness from Rockwell C-55 to C-60, is highly corrosion resistant, non-magnetic, nonsparking, and in tests has demonstrated its ability to outwear hardened steels from 3 to 10 times.

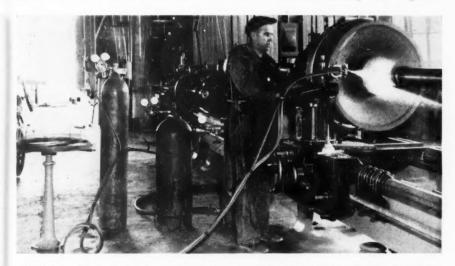
Grinding a marine piston prior to spraying. Cost of a new piston was \$1750 plus \$10,000 a day loss due to ship tie-up. The complete metallizing job was accomplished in 33 hours. This brings up the question as to whether the wearability of sprayed metal justifies its use. Tests under both laboratory and service conditions have proved that with proper application using the recommended spray metal a part rebuilt by metallizing will usually outwear the original part. Two inherent characteristics of the metallizing process are responsible for this. First, when a medium or high carbon steel wire is used in spraying, the rapid quenching of the molten particles as they contact the cold surface against which they are directed results in ex-



treme surface hardness. Using .80 or 1.20 carbon steel wire, surface hardnesses in the neighborhood of Rockwell C-45 are obtainable.

Secondly, sprayed metal is porous in character. In some instances, it may be compared to the sintered bearings produced in powder metallurgy. These pores absorb and hold oil, resulting in a high degree of lubrication at all times. In fact, under controlled test

ferent types of work and with the service conditions under which the part must operate. Suffice it to say that metallizing wires representing nearly all common alloys are available, and steel wires with any degree of carbon content can be obtained. There are special types of wires available for special types of work, but here again the applications are so varied that the advice of a metallizing field engineer



Rebuilding a turbine shaft with stainless steel. The shaft has been deeply scored by the packing.

conditions, sprayed bearing and journal surfaces, after being saturated with oil, have been operated under heavy loads for hours without additional lubrication. The oil formerly soaked up by the pores in the metal acted as the lubricant during this "dry" run.

It is not the purpose of this article to detail specifications for each type of metallizing job, nor to describe the best wires available for different types of work. Such details and recommendations can be secured from any manufacturer of metallizing equipment. They will vary considerably with dif-

or representative should be sought.

Aside from the metallizing gun, a supply of metallizing wire, and a wire reel, most machine shops have on hand all the equipment necessary to use the process. Parts must be thoroughly cleaned just prior to metallizing to remove all impurities that might affect the bond, and then must be sprayed soon after cleaning to prevent formation of an oxide film over the unprotected metal. This cleaning may be done in any type of cleaning equipment that provides the desired results. Hand swabbing of large components will suffice if it is carefully performed.



The Cincinnati Utility Shaper answers the need of many shops for a fast utility tool—a handy shaper for a moderate price—but still retaining all of the essential refinements of the larger shapers.

The Utility model, equipped with the Universal Table, carries all the advantages of the Universal Shaper and makes an ideal tool for the tool room. It embodies all the other characteristics and conveniences of Cincinnati Shapers with the exception of Power Rapid Traverse. This feature may be added if desired.

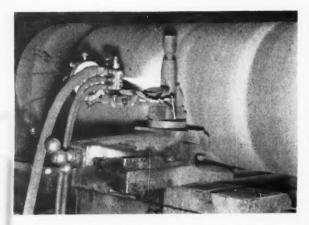




Write for the new Shaper Catalog N-5.

#### THE CINCINNATI SHAPER CO.

CINCINNATI 25. OHIO U.S.A. SHAPERS · SHEARS · BRAKES



A printing press feed roll being resized and salvaged by metallizing. High carbon steel wire was used.

In surface preparation, any lathe in which a circular part can be chucked will serve for rough threading. The same lathe can be used to turn the part while the fuse bonding electrode is held against it and moved progressively from one end to the other. In general, when the part is mounted in a lathe for surface preparation, the same setup can be used to position and move the part while the metal is being applied by a mounted spray gun with longitudinal travel adjusted to the desired rate of metal application.

The shape and size of non-circular parts will often dictate the method of surface preparation. Formerly, irregular surfaces were usually prepared by grit blasting; however, with the Sprabond intermediate coating, only cleaning is required. In addition, the special alloy wire enables the build-up area to be feathered out without danger of edge failure. The same applies to the Sprayweld process.

Finishing of the metallized part depends also on the type of wire employed. The softer alloys and low carbon steels can be machined to size. The high carbon steels and specialized hard-facing wires must be ground to finished dimensions. Sufficient build-up during spraying must be obtained to

allow for finishing, and this amount will depend to a great extent upon the skill of the operator in holding true dimensions. In general, the sprayed metal deposit, after finishing, should be at least 1/32 inch thick.

Two factors decidedly in favor of metal-

lizing are the relatively low cost of the process and the speed at which it can be employed. In one shop, for instance, a 30-inch spindle on an automatic screw machine became badly worn and had to be rebuilt or replaced. Cost of a new spindle was \$110 plus teardown, lost machine time, and subsequent reassembly. The problem was solved by rebuilding the shaft by metallizing, without removing it from the machine, at a total cost (time and materials) of \$2.75.

In another case, the bore in a \$500 rotary table for an oil rig was accidentally machined 0.008 inch oversize. The table was then set up in a boring mill, adjacent areas masked, and the surface to be sprayed cleaned with a power-driven emery belt polisher mounted in the boring mill toolholder. The cleaned area was then sprayed with Sprabond to a depth of 0.004 inch on the radius. In this case, it was possible to hold spraying dimensions within 0.0002 inch, and final machining was not required. The \$500 table was thus salvaged at a cost of \$18.75 inclusive.

The illustrations accompanying this article show some of the numerous shop uses to which metallizing may be applied. In many cases, actual accomplishment of the work does not follow



### S.E.C.O. BOOSTS PRODUCTION 22%

Sunoco Emulsifying Cutting Oil Ends Rusting, Decreases Downtime, Results in Big Savings

When an emulsifying cutting oil is unable to prevent excessive rusting on machined surfaces, that's bad. But if, in addition, it has an offensive odor, that's worse... especially if you have to change it twice a week and thoroughly clean the machines. Three years ago a large manufacturer of electrical products sought a solution to just such a problem. It occurred in his machining of cast iron end-bearing cages for induction motors.

His search ended when a Sun representative introduced him to Sunoco Emulsifying Cutting Oil. Not only has S.E.C.O. prevented the rusting condition, but also cutting fluid changes are now spaced six weeks apart. Translated into management language, the performance of S.E.C.O. has boosted production, curtailed costs, effected savings. By sharply decreasing

downtime, it has increased output 22 percent. Savings on oil and maintenance costs are amounting to almost \$5,000 a year. The manufacturer is so well satisfied with Sunoco Emulsifying Cutting Oil that he uses it now in every machine which requires a soluble oil.

In all machine shop operations, on both ferrous and nonferrous metals, you'll find Sunoco Emulsifying Cutting Oil and Sunicut straight cutting oils of real assistance. They help maintain production schedules, lengthen tool life, and keep operating costs down. For a free Sun cutting oil recommendation card, write Department MM-5.

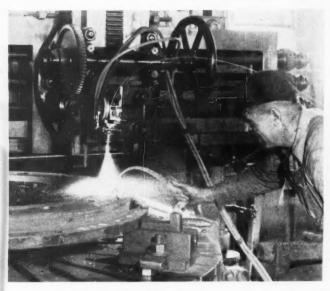
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Building up a faceplate from a rotary oil rig. Note impromptu method of attaching metallizing gun to machine.

what can and what cannot be metallized. owners and operators of this equipment will but study applications used by others and apply the fundamentals of knowledge thus gained to their own problems. they will be pleasantly surprised at the many pro-

fitable applications of metallizing that hitherto have escaped their notice.

(All illustrations furnished courtesy Metallizing Company of America)

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

a set pattern, but is solved by the ingenuity of the operator or his superiors. This versatility of the process to perform various jobs under different conditions and to meet a variety of requirements makes it use, predicated on initial equipment costs, one of the most economical shop tools available for maintenance and salvage work.

In visiting numerous shops where metallizing equipment is available, the author has noted a tendency to ignore many possible applications of the process in favor of preconceived ideas of

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▼ 470 individual sizes carried in stock in variations of .001 from .032, .033, .034, .035, .036, etc., all the way up to .501; Any size required larger than .501 . . . blanks can be ground to your exacting specifications, delivered in 3 or 4 days. By purchasing SUPEREAM Reamers in steps of .001 you SAYE time, labor and money in the cost of extra machining and lapping. SUPEREAM Reamers all have ground and polished flutes and are held within .0002 tolerance.

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Reamers are also furnished in Right-hand spiral, Right-hand cut, as well as Left-hand spiral, Right-hand cut. These specials are delivered in 3 to 4 days.



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You save in power, floor space, and in initial investment. You get a machine, that gives the operator maximum ease and speed in handling.

The machine is sturdy, and will give continuous high production.

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# High Quality, Low Cost Production Through Use of Power Tools

A case history of the economy afforded by use of air operated tools.

BY EDMOND C. POWERS

WITH labor and overhead costs reaching an all time high, many small businessmen and manufacturers are faced with the problem of increasing production to meet demand and, at

the same time, maintaining the high quality of the product without raising the price. One of the most practical solutions is making the maximum use of modern machinery and developments

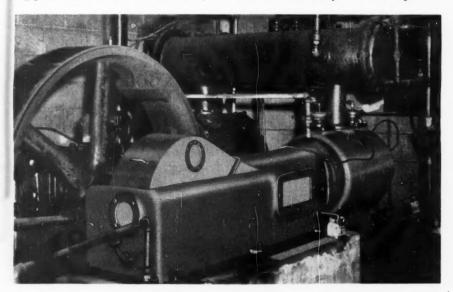


Fig. 1—A stationary, reciprocating compressor with a capacity of 315 cubic feet of air per minute supplies power for 34 pneumatic tools used by the Pride Mtg. Company. The major portion of this supply is used by another company occupying the same building.



Fig. 2—A heavy-duty eight-inch grinder used in finishing the stainless steel top of a kitchen sink costs about 6 cents an hour to operate—about one twenty-fifth of the operator's hourly wages.

making the maximum use of power in his manufacturing process can be seen at the Pride Manufacturing Company, Pittsburgh, Pa., producer of stain-

less steel sinks for homes. By applying pneumatic tools, operating on the already-available source of air power, this company has been able to save a considerable amount of money and still increase production to over 40 finished sinks a day.

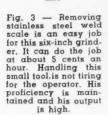
Pride Manufacturing Company occupies the second story of a two-floor building. The major portion of the building is taken over by a commercial heat treating company, which has used

so as to gain highest possible efficiency.

If ten men operate tools eight hours a day, with labor and overhead costing \$3.00 per hour, their time will cost \$3 x 10 x 8, which equals \$240.00 per day. If output can be increased only ten per cent by improvement in tools or power, the savings on the ten men will be ten per cent of \$240.00 or \$24 a day.

The widespread application of power tools for solving the problems of high

overhead and labor costs has resulted in a better product for the consumer. A typical example of a manufacturer





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Lamina Guide Bushings are made of hardened steel with .001" to .002" of bronze electro-plated on the inside diameter. In addition to this, an oil groove, 5½" wide is machined into the

inside wall in a figure eight pattern. Each bushing is furnished with an alemite fitting for lubrication of the oil groove.

In actual use on hundreds of Lamina-built dies, in laboratory tests under conditions far more severe than shop conditions, these bushings without exception have proven absolutely trouble-free in service.

Stocked in a variety of sizes and lengths for straight pins, shoulder pins or removable pins. Specials made to order. Lamina Dies & Tools, Inc., 14925 W. Eleven Mile Road, Berkley, Michigan.

Send for Lamina bulletin which gives full details and dimensions on Lamina Guide Bushings. Also contains information on a variety of other Lamina tools.

dies and job proven die making equipment.



DIES AND TOOLS

Fig. 4 - Tools of the size shown here gre easily handled and yet perform a large job for such a small tool. Rotating at approximately 12,000 revolutions per minute, this pneumatic tool does high quality work at a low cost.

compressed air power for many years. Pride Manufacturing Company draws air from this company's horizontal singlestage, reciprocating compressor

which produces 315 cubic feet of air per minute. Fig. 1 shows a view of the compressor. The heat treating company consumes the major portion of the 36,900 cubic feet of air each hour. and the Pride Manufacturing Company draws from the remainder which is piped to its floor by a two-inch pipe and distributed to the pneumatic tools through three-quarter and five-eighths inch hose.

Pride Manufacturing chose pneumatic tools primarily because of the high power they develop per pound of weight. The use of compressed air as a power source makes it possible for these tools to be powerful, flexible and



easy to handle. Pneumatic grinders can remove metal rapidly because of sustained speed under load. The high power capacity of the tool provides ample energy to maintain speed under load while the free speed is controlled through use of a governor or other device. When the tool is put to work, the load starts to reduce the speed and the tool is then supplied with additional air to keep cutting action at a high rate.

The advantages of air-operated tools becomes even more pronounced under present shop operating conditions, since labor and overhead costs have risen steadily at this company, while

Pictured: a 24-Spindle Heavy-Duty Drill Head.

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the cost of air power has remained the same. The cost of operating pneumatic tools is surprisingly low compared with the cost of the operator and the cost of providing the necessary facilities for the operator.

An average size heavy-duty eightinch grinder, as shown in Fig. 2, used by the Pride Manufacturing Company for rough work and quick winking, rotating at about 4000 revolutions per minute, uses approximately 50 cubic feet of air per minute. With a 40 per cent factor of use, this would equal 1200 cubic feet per hour. At a cost of five cents per thousand cubic feet, the cost of operating the grinder is just six cents an hour. This is one-twenty-fifth of the hourly wage of a skilled operator making \$1.50 an hour.

The cost of the compressed air is insignificant compared with the wages of the operator. The increase in a workman's output due to the use of pneumatic tools more than pays for the cost

of air many times over.

Pride Manufacturing has 34 pneumatic such tools operating off the compressed air supply. Air consumption of these grinders varies with the size of the tool and the nature of the work. The sixinch grinder. shown in Fig. 3, is being used to remove stainless steel weld scale consumes and from 20 to 50 cubic feet of air under load. Under average conditions it is usually less than 35 cubic feet per minute.

Actually, tools are used only a part of the day since other jobs leave the tool out of operation. The cost of operating this six-inch grinder may be computed as follows:

Write

Thirty-five cubic feet per minute



1. Eliminate slowed production due to coil curvature. 2. Minimize wear and tear on dies. 3. Increase production-lower costs. 4. Save man-hours-produce straighter stampings-eliminate hand straightening time after stamping. 5. Cut rejects to a minimum. 6. Increase safety of operation.

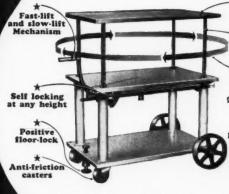


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STAS PHANTS



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Fig. 5—For special jobs requiring a small working face, this pneumatic grinder unit can be worked as easily as holding a pencil. The press-control switch is worked by the forefinger and the small head fits into corners and tight places with ease.

times the factor of use, 50 per cent, or air consumed per minute equals 18 cubic feet. This equals 1080 cubic feet per hour, which, at a cost of five cents per 1000 cubic feet results in a cost of approximately 5 cents per hour to operate this tool. In addition to this tremendous cost saving, the finished job is of highest quality.

The two-inch tool shown in Fig. 4 is being used to finish off the corners of a stainless steel sink. This tool is operated at about 12,000 revolutions per minute off a three-eighths-inch hose. The tool itself weighs under four pounds and is light and flexible enough to be conveniently operated by a woman with no strain whatsoever.

The small grinder shown in Fig. 5 is a one-and-one-half-pound tool equipped with a five-eighths diameter head used for working inside corners and in close fitting areas. Operators appreciate light tools of this type because they are easily worked in tight and exacting positions.

The choice of compressed air as a

power system for the finishing process on the sinks manufactured at Pride Manufacturing Company has more than satisfied all expectations. Because of intelligent and far-sighted management, Pride Manufacturing Company has been able to solve the problem of high production costs. The maximum use of a low-cost power supply has enabled this progressive company to meet present-day production problems with great success and, at the same time, make the jobs performed by the

worker easier and more productive.

(Data and photographs for this article were obtained by Compressed Air and Gas Institute through the courtesy of Pride Mfg. Co., Pittsburgh, Pa.)



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FOUR STEPS-and you've got the right answer!

- 1. Move arrow to major class covering application
- 2. Select sub-group which best fits application
- Note major tool characteristics (under arrow) and other characteristics in cut-outs for each grade in sub-group
- 4. Select tool steel indicated

That's all there is to it!

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- Application Deep drawing die for steel
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- Sub-Group Special Purpose
- Tool Characteristics—Wear Resistance
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Now you can start with the application, and the answer you get from the Selector will prove satisfactory in every case, for the Crucible Tool Steel Selector covers 22 Tool Steels which fit 98% of all Tool Steel applications. You no longer need to start with a steel of known characteristics and back your judgment with a costly trial experiment.

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An Analysis of Bending and Forming Dies

C. W. Hinman

"Freezing" alloy dies — Controlling hydraulic pressures when forming — Forming corrugated sheets in press brakes — Forming various shapes in side-cam dies.

By C. W. HINMAN Designing Engineer

COMPARATIVELY recent development employed in the preparation of forming dies made of soft alloy metal involves the subjection of the dies to extremely low temperatures prior to use. The process is being used successfully in conjunction with the use of dies made of Cerrobend metal alloy.

This alloy, composed of bismuth, tin, and lead, is ordinarily so soft that it may be readily melted in boiling water, and yet, it is being used with excellent results by Ford Motor Company engineers as a practical die material for producing experimental parts.

The softness of Cerrobend was over-

come by immersing dies made of this material in liquid nitrogen, one of the coldest substances known. The freez-



Fig. 1—An experimental forming punch and die made of Cerrobend metal alloy and then hardened in a chilling unit. This forming die is used to form a limited number of workpieces, as shown, in a press supplying 10,000 lbs. pressure. (Illustration Courtesy Ford News Bureau)

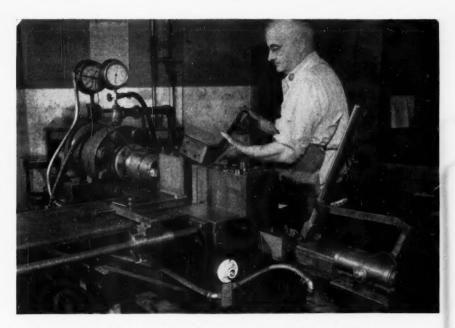


Fig. 2—Removing α formed bus bar from the die in which it has been shaped in an hydraulic press. The preselective pointer is shown on the pressure gauge located at the rear. (Illustration Courtesy General Electric Company)

ing unit into which the Cerrobend forming dies are immersed provides a temperature of 320 deg. F. below zero. The freezing action thus obtained intensifies the hardness of the die surfaces from a consistency comparable to dried putty to that far greater than the hardness of ordinary brass.

A total of from six to ten stampings are obtainable from a die which has been subjected to a single chilling in the frigid bath. In the past, experimental engineers had been compelled to wait for a period of six to eight weeks for small steel dies to be completed by the toolmaker. Now, Cerrobend alloy dies can be produced and simple parts such as those shown in Fig. 1 formed in from 24 to 48 hours. This is only one example in which ingenuity has overcome adverse conditions.

One of the problems encountered in

the operation of an hydraulic press has been the securing of an exact amount of pressure from the ram each time it is advanced. In bending and forming operations it is essential that a repeated minimum pressure from the ram be obtained and no more than just a sufficient amount. Too much pressure overloads the press unnecessarily, especially when forming a steel part, and in the case of forming some nonferrous metals, the work often becomes distorted.

This difficulty has been solved in the General Electric Company's plant at Schenectady, N. Y. An indicator gauge was attached to an hydraulic press which normally operates at 2,000 to 3,000 lb. pressure per square inch. This press is used to bend bus bars of assorted thicknesses and widths and to various angles, as shown by the sample



Fig. 3—A close-up view showing method of setting the preselector gauge.
(Illustration Courtesy General Electric Company)

bus bar in the operator's hands, Fig. 2. This press is operated at the rate of three stroke cycles per minute, and is of the semi-automatic type.

Figure 3 shows a closeup view of the gauge used. This gauge is a standard, 5-inch dial type instrument to which a

preselective pointer has been added. When the press ram advances, pressure tonnage is "built up" to where the standard pointer touches the preselective hand, the latter having been set to the desired tonnage, and upon contact closes a circuit which operates a relay. The relay energizes a 50 lb. pull solenoid armature which, in turn, trips

a spring mechanism on a valve that causes the ram to be released, after having done its work.

This mechanism provides a very satisfactory method of controlling the pressure. Releasing the pressure by this method provides several addi-

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tional advantages over a by-pass type of pressure control. Selection of the desired pressure, or tonnage, over the entire range of cylinder capacity is simple. When using oil at high pressure, instead of water, this new method does not cause the temperature of the oil to rise as formerly occurred when

when it has been determined by trial just how many tons pressure is necessary to form the piece and to also allow the spring back, and the pointer is in the proper position, each of the individual work parts will be formed approximately alike. In fact, there is so little difference in their sizes and shapes

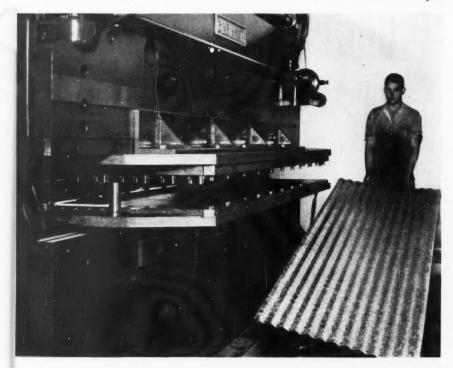


Fig. 4—Forming corrugated sheets on a press brake. (Illustration Courtesy The Cincinnati Shaper Company)

the oil was continuously by-passed through the valve.

When forming steel parts, this idea has further advantages. Parts formed of steel usually show excessive "spring-back," and because of this condition, it is often necessary to form parts beyond their actual size, and depend upon spring-back to restore them to normal size after forming. But,

that the small variations can be safely ignored.

# Forming Corrugated Sheets in Press Brakes

Figure 4 illustrates a special forming punch and die in position on a Cincinnati press brake. The punch and die are designed for corrugating steel or aluminum sheets of the types used as

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Continuous, repeat markings of type on each piece of Brown & Sharpe Ground Flat Stock make identification easy.

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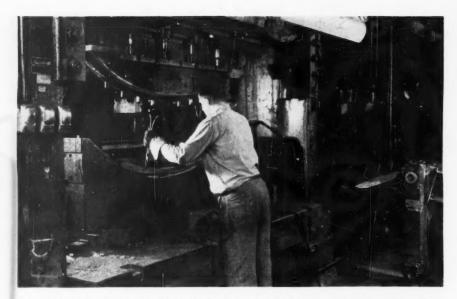


Fig. 5—Illustration showing a die for hot forming automobile bumpers in a two-point enclosed press of 700 tons capacity. (Illustration Courtesy E. W. Bliss Company)

construction material, or for airplane "skins." By simply removing the die set, the machine may be immediately changed back into a press brake.

Press brakes are playing a prominent role in modern industry. Several different types of die work can be set up in progressive order on a press brake, because of their unusual length and profitable versatility. Complicated workpieces may be formed in several operations and finished on a single ma-

chine—workpieces that might require the production of several conventional presses.

Corrugated aluminum alloy sheets 16 feet long have been formed on these machines. Press brakes have an unlimited number of other uses which are fully illustrated and described in the manufacturers' catalogs.

Figure 5 illustrates a forming die which is attached to a press used for hot forming the "wrap-around bumper





# end for this catalog GORTON TRACER-CONTROLLED MACHINE TOOLS

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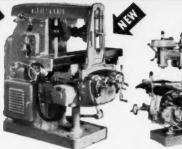
Send for your copy today. Gorton tracer-controlled milling em-bodies distinct advantages on the production line and in the tool room. In many cases, special tooling will make a given operation entirely automatic. Send for the Gorton General Catalog illustrated above or for any of the other specialized bulletins described below-published for your information and reference.



0-16A VERTICAL Incorporates all of the desirable features of former 8-D. Also available with swivel or universal head. Bulletin 2240.



0-16A DUPLICATOR Rugged, versatile extra sensitive for exact-ing die and mold work. Also available with swivel or universal head. Bulletin 1319.



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CUTTER GRINDER
Universal type; bench
or floor models; capacity up to %" dia.,
including ball nose and multi-flute cutters. Bulletin 1317.



16-B AUTOMATIC LATHE For precision turning of long slender parts from .005" dia., by 1/32" long to 7a" dia., by 234" long. Bulletin 1800.

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guards" of a late model automobile. At the right, an endless chain carrier delivers the heated blanks from a furnace, not shown, but which is located at the right rear.

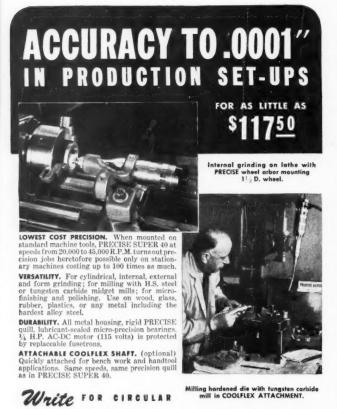
Spring pins, inserted through the forming punch, cause the formed bumpers to remain on the die when the punch ascends. The press operator is shown removing a formed bumper from the opened die. The gross output is approximately 40 bumpers formed per hour.

# Forming Various Shapes in Side-Cam Dies

Figure 6 shows a view of a drawing which illustrates the usual drafting technique employed in designing a side-cam die. The die itself represents one of several available methods which may be used in forming a yoke section in one press stroke. Shown in both its open and closed positions, this die is composed of the followng parts: **B** is the punch-holder; **C** two horizontal slides attached on forming punches

D-D; E the vertical forming punch; F two stops for slides C-C; G two side cams; H is a T-shaped compressed air tube, and I are two air operated compression pins located under the work.

Various tubular shapes can be formed in a die of this type by using suitable shapes for punch E, and punches D-D. For example: round shapes, tubular hexagonal, octagonal, and rectangular shapes can be formed. An improvement in this die is the addition of bumper pins in the die set to halt punch E at the completion of the stroke. Bumper pins serve to protect the small neck of metal that attaches E to the main punch.



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# **CARD**Spiral Pointed

# TAPS

# Perform Better and Last Longer

Here's Why...

For tapping deep through holes, or blind holes when there is bottom clearance for chips, Card Spiral Pointed Taps are always your best bet.

One major advantage is their superior cutting

action, performed by the first few threads which are milled at an angle to the axis of the tap. This, together with the extreme rake of this feature, produces a long curling chip, which is forced ahead of the tap, as illustrated.

Chip clogging is thereby eliminated, allowing a shallow, straight fluting that increases tap strength and reduces breakage to a minimum. In fact, a single Card Spiral Pointed Tap has often completed a difficult job—cutting freely all the way and producing excellent threads—where two and sometimes three ordinary taps would be required.

For every kind of tapping job there's a Card Certified\* Tap that will give you smooth, troublefree, money-saving performance. See your Card Distributor for quick, helpful service.



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DIVISION OF UNION TWIST DRILL COMPANY





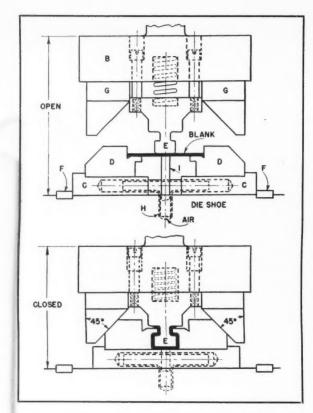


Fig. 6—Drawing illustrating one of several available methods which may be employed to form a yoke section at one stroke of the press.

load on them increases rapidly as the die closes. Compressed air gives a steady push that is both instantaneous and positive.

The horizontal arms on T-pipe H are sliding fits within reamed holes in slides C-C. The main stem of this pipe is welded on to make the T-shape: it extends down through the die shoe and press bolster plate, and its lower end is connected to an airfed hose from the shop air line. A similar arrangement also takes care of pressure pins I-I. Air pressure at 80 p.s.i. keeps the slides

separated and constantly in contact either with stops F-F, or with the face edges of side cams G-G, in descent.

Using compressed air of 80 p.s.i. and a ½-inch diameter reamed hole for the pipe, the developed pressure on each slide is approximately 0.7854 x 0.500° x 80, or 15.75 lb., and with 100 p.s.i., a pressure of 20 lb. per slide is obtained.

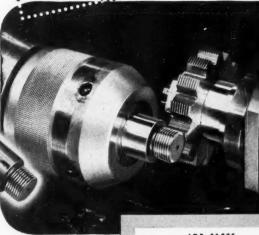
The application of compressed air in place of coiled springs, as similarly employed in large dies, is used in this small die for members **D-D** and **I.** Springs fail occasionally, and costly "down time" is lost when removing the tool from the press for repairs and replacement of springs. Springs may also vary under the pressure load; the

# Average U. S. Factory Worker Has 13 Helpers

THANKS to electrical energy, the average U. S. factory worker now has the equivalent of 13 full-time assistants to help him earn his daily bread.

It's a matter of horsepower as well as manpower, says E. C. Brodin, director of manufacturing research for SKF Industries, Inc. American factories have an installed horsepower of 18,000,000, and there are 14,000,000 industrial workers in the country. Since one horsepower is mathematically equivalent to 10 working men, that gives the average man at the machine the aid of 13 other "men."





A change in tool design on this class 3 thread milling job has brought production advantages and simplified operation evidence that it pays

to use cutters designed to suit the job conditions.

Ground shank type thread mills previously used have now been redesigned as unground shell type cutters. In addition to the larger diameter and greater number of teeth, this design provides a rigid, short-coupled drive.

Results show: FASTER SET-UP-due to easier mounting on the machine and gaging size across an even number of teeth; EASIER SHARPENING—three cutters at a time in place of one; MORE TOOL LIFElarger number and longer cutting teeth give 3 times as many sharpenings and 50% more pieces per sharpening; LESS TOOL COST—unground cutters produce the accuracy required; and MORE PRO-DUCTION-8 pieces more per hour are threaded.



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JOB FACTS

Operation - Mill 3/4"-16 class 3 threads on pump shaft

Material - 4120 Steel, 25 R.C.

Cutters — B-C Job-Engineered Shell Thread Mills, 3" x 5/8" x 1"

Speed - 225 RPM

FI-to-FI -

Former 27/hour 5 sharp.

Present 35/hour 15 sharp.

100 pces. per sharp. 150 pces. per sharp.

It pays to use Job-Engineered cutting tools wherever standard dimensions will not apply. The savings speak for themselves.

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P-32T PRECISION SPINDLE

Users Vote This One of The Most Useful and Successful Spindles Ever Built P-32T over-all length 2514", 3" or 31/2" dia. barrel, 3.450 RPM motor. P-6751 is some design, motor housing 2" longer, 1800 EPM motor.

Designed to equip 6". x 18" surface grinders with a Spindle that would produce finer finishes at lower cost, this POPE Direct Motorized, Sealed Package Spindle has not only swept the field on this application but has been promptly drafted for hundreds of other jobs.

A glance at the cut-away spindle will show you why this 1 HP, 3600 RPM sealed-package motorized spindle has been successful in so many different applications.

It has two double row precision cylindrical roller bearings and two thrust bearings all permanently

preloaded and permanently lubricated. No further attention as to bearing adjustment or lubrication is required.

It has a full 1 HP motor not only "fully enclosed" but permanently SEALED-IN. No dirt or dust can ever reach the motor or bearings.

This spindle can be mounted horizontally, vertically or at any angle.

You can buy this Pope Sealed-Package Spindle with confidence. It will remove the surplus metal fast and produce a fine surface finish.

A few of the many adaptations of this spindle are shown below



31/1" dia. barrel 11 7/16" long, 1" dia. spindle nose tapered 3" per foot. Wheel Holder P-551 or P-555 for wheels with 11/4 holes and widths up to 34



P-442

3" dia. barrel 7" long, 1" dia spindle nose topered 3" foot. Wheel Holder P-551 or P-555 for wheels with 1 1/4" holes and widths up 10 %".



### P-5101

2¾" dia. barrel 16" long and 4" dia. barrel 3" long, 1" dia. spindle nose tapered per foot. Wheel Holder P-567 for wheels with 11/4' dia. holes, widths up to 1



# P-2641

3" dia. barrel 5" long, 114" dia, straight spindle extension ½" long, 1" maximum dia Jarno tapered hole with 7/16 - 14 R.H. tapped hole at bottom for standard interchangeable extension arbors or collet chucks.



### P-1723

3" dia. barrel 6" long with flange for endwise adjust-ment screw. ½" dia. straight spindle extension with collars and nut for wheels with 1/2 dia holes and for widths up



3½" dia. barrel 30" long and a 3½" dia. extension 4" long at opposite end of motor. diameter spindle nose tapered 3" per foot. Wheel Holder P-555 for wheels with 11/4" holes and for widths up to 3/4".



### P-640

" dia. barrel 121/4" long, 11/4" dia. straight shaft 5" long reduced to %" dia., 11/6" long. Wheel collar and wheel retaining screw for wheels with %" dia. holes and widths from 1" to 114".



4" dia. barrel 16%" long Spindle extension is 1%-18 L.H. threaded, 7%" long. 2 Wheel Holders for wheels with 1¾" dia. holes, ½" wide. Cup type wheels facing each other are shown. Outer wheel holder can be located is wanted.

Write for Data Sheet #12 which will assist you in preparing specifications for the unit you require.



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# Simple Tooling Control Pays Dividends

To be effective, control systems should embody "production-line" principles.

By H. G. FROMMER
Chief Tool Engineer, Trackson Company, Milwaukee

Manufacturers desiring to maintain facilities for the design and construction of jigs, fixtures, dies, gages and templates for use in the production of their own products will experience many difficulties in controlling such an undertaking, unless a system is used to effect full cooperation between all partaking departments and individuals without the sacrifice of speed, as well as to provide permanent records and accurate cost figures for future reference.

From the time the drawing leaves the designer's board until the completed fixture is actually used on a production run and has proved itself satisfactory, many steps must be taken to assure a "flow" similar to a production assembly-line. In many cases, time allotted the tooling program for any specific project is too short to complete all tooling before production is started, and often the shop personnel is forced to shift for itself, improvising as it goes along. Then, the possibility arises that completed tooling lies unused in the tool crib or storage areas unless the shop supervisory force is properly and promptly notified of completion.

Another reason for a control system is the need for accurate cost data. It

is rather difficult to estimate tooling cost realistically, as so often requested by management, if no actual case history is available as to past performance of the toolroom. Jigs, fixtures, dies, and so on, are built on basic designs and can be grouped for estimating purposes. From accurately kept data, it is quite possible to predict tooling cost within plus or minus 5 per cent.

Proper inspection as to conformity to the design, as well as actual performance during regular production runs, is essential and, if adhered to tenaciously, will eliminate down-time and arguments.

Obviously, any effective tooling control must originate at the tool engineer's or planner's desk. After preliminary study of the tooling program and listing of tools needed in order of their importance to the shop—considering building time, of course—the design stage is entered. Immediately upon completion of design, a separate "Tool Manufacturing Order" ("T"-order) is issued for each and every jig, fixture, die, gage or template, as shown in Fig. 1. Upon viewing the order form, the first impression may be one of undue complexity. However, after delving into the individual requirements of

ROUTE TO				TOOL MANUFACTUR				
DEPARTMENT TOOL MFG. TOOL INSPECTION	A.K.	MFG. ENGINEER 2. DUPLICATE TO 3. TRIPLICATE TO 4. THIS ORDER WE	FOR REFERENCE AND BE ROUTED TO DEPT	MANUFACTURING DEPT. S. INDICATED ON ROUT! MFG., TOOL INSPECTIO	FOREMAN.			
TOOL CRIB	CINA			L RECORDS FROM THIS	ORDER.			
STANDARDS ENG.	100	T ORDER NO.	TOOL DESCRIPTION	Drill Jig			TOOL	NUMBER
ACCOUNTING DIV.	Rn	T-2578	OPER. Drill	(6) 1/2" D. Ho	les	No. 7	J-7-	2334
MFG. ENGINEER	Da	PART OR ASSEM. NO.		TION OF PART OR ASSE		MODEL	MACH.	DEP
Tool Engrg	HGF	7-2334	Mounting	Bracket		T-40	323	62
		DATE ORDERED	DUE DATE	DATE COMPLETED	ESTIMA	TED COST	T ORDI	ER COST
		2-10-50	3-14-50	March 6, 1950	92.0	00	* 91	0.26
TOOL ITEM NO.			INST	RUCTIONS			DATE CO	MPLETE
	No	special ins	tructions	routine pr	rocedure		6	1
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CODE 16	-D	2 Shee	ets "E"	Stock # 3 S	ec.A-2 Vn C-22	REV.	C	
NEW REPAIR		CONFORMI	TY INSPECTION			RMANCE INSPE	CTION	
X.	BY C	Ma	3/6/5	50 my	R.T	DATE	arch 14	, 19

Fig. 1—A Tool Manufacturing Order ("T"-Order) is issued for each jig, fixture, die, gage or template.

data, it will be seen that no unnecessary information is included.

Starting by assigning a "T" number in numerical order, the tool engineer enters the following information: tool description, operation description, (that is, the operation to be performed by the tool), operation number, tool number, part or assembly number (part on which tool is to be used), name of part, model number, machine(s) and department(s) for which tool is designed, issuing date of "T"-order, due

date, and estimated cost. For recording purposes mainly, drawing sizes, revision numbers, and code are entered. The code groups tools as to their types and ties them to the manufacturer's model numbers for purpose of reports and summaries at the end of the fiscal year.

Ample space is provided for instructions and small sketches which sometimes eliminate the need for separate tool drawings when simple devices such as special bolts, parallel blocks or smaller items, are to be made.

This order is made out in triplicate, the last copy being a heavy, green card designed to withstand considerable

# CAUTION DO NOT USE THIS TOOL FOR PRODUCTION UNLESS OK'D FOR PERFORMANCE BY INSPECTION. TOOL DESCRIPTION. Deill Tig - (6) 1/2" DIA HOLES "I" ORDER NO. 2578 TOOL NO. 5-7-2334 CUNFORMITY INSP. WAS MADE MARCH 6, 1950 BY C.MICE PENFURMANCE OK FOR TRODUCTION DATE MARCH 14, 1950 INSPECTUR. INSPECTUR.

Fig. 2—A tag of this type is attached to tools which have not been tested for performance in the toolroom.

Model.		Drill Jig		COVERED T 9 2554
DEPARTMENT			SECTION A D	100
10	STOCK ROOM # 3	2	A-2	C-22
PART HOS.	7-2334			
OPERATION	7			
BATE	3-14-50			
DATE				
MACHINES USED ON	323			
DETAIL DESCRIPTION AND REMARKS		Drill (6) 1/2" Dia. Holes	Holes	
Mounting Bracket	Tracket	Revision C	J.O. T-2578	
TRACKBON COMPANY	ANY	F	TOOL RECORD	

abuse in its journey through many hands. The original order (yellow) is sent to the Cost Accounting Department where a job order sheet is set up. This sheet is keyed to the "T"-number against which all subsequent labor,

material cost, and purchased items are charged. The tool engineer, before isof all tooling suing the "T"-order is required to requisition all needed materials and supplies from stock and inform the Purchasing Department of all items to be obtained by outside purchases. Together with the blueprint and stock requisitions, the "T"serves order duplicate (white) and triplicate copies are indata serted in a celluloid covered pouch which is delivered to the toolroom foreman. where the duplicate copy is removed and placed into a "Work preserves Ahead" follow-up file in order of urgency. Before work is Record

Before work is commenced, the pouch is sent to the various stock-rooms, where the material requisitions are withdrawn and the required raw materials and parts are selected and sent to the toolroom. Meanwhile, purchased parts have arrived at the toolroom and since these, as well

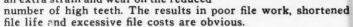
as those drawn from stock are keyed to the "T"-number, no difficulties are encountered in assembling the materials to start the job.

After completion, the tool is delivered to the Inspection Department,



No, it's the magnified "horizon" of a series of Nicholson file teeth as viewed through an optical comparator (a "seeing eye" instrument that profiles objects and enlarges many of them up to 125 times). Note that the teeth are all uniformly high, uniformly spaced—ready to share the work evenly. The added check-ups afforded by this scientific watchdog help greatly in keeping the file-cutting machines in perfect adjustment—thus preventing the uneven spacing that usually results in high and low teeth like this....

And what good are low file teeth if they can't reach the work? None at all. What's more, shirking their duty puts an extra strain and wear on the reduced



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DATE         COSTS           PURCHARED FROM OR         ABOUNT           APPRAISAL RECORD         REMARKS           OATE         BAT DEFAL	NUMBER		ACCOUR	ACCOUNT NUMBER		DATE ISSUED						
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where it is checked against the blueprints. The inspector initials and dates the order for conformity inspection. So far, however, the performance of the tool has not been tested and, since faultless operation is the ultimate

proof of the tool's worth, the tool is returned to the toolroom, providing it is possible and practical to simulate actual working conditions. Frequently, a performance test in the toolroom is not satisfactory and sometimes not readily possible. In such cases, the tool is provided with a tag of the type shown in Fig. 2 and delivered to the tool storage area together with the order. The tag indicates that performance inspection will have to be conducted on the first regular production run and that an inspector must be called to attend.

in

shown

Tool

At the storage area, the attendant places the tool and notes its physical location on the order, which is then routed to the Standards or Methods Department. In this department, the routing and procedure sheets are corrected to include the newly finished tool, standard times are changed as required, and the Production Control Department is

notified as to completion of the new tool. This last step is rather important as its omission may mean that production orders going through the shop at the time of completion of the new tool may be continued without the LOOK AT THIS PRESS

It's designed to provide industry with low-cost, high production units that are highly flexible in design and operation...relieving heavier presses of short runs and lighter work. Presses are practically fool-proof in operation. Frame is extremely rugged. Fingertip controls are conveniently located at hand level. Available for immediate delivery, in standard width (between uprights) of 24"—31"—36"—42" respectively. Available in special width up to 72" at small additional cost. Movable bed plates. Pumping unit has by-pass relief valve which can be set at any pressure up to press capacity. All Standard presses equipped with 2-speed built-in hand pumps for more sensitive and versatile operation.

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CYLINDERS: Standard Models furnished with 6" bore, 7½" stroke—spring return type; also 5" bore, 7½" stroke—spring return type. Above presses are standard. Following can be furnished at additional cost: Double Acting, 6" bore, 7" stroke; 6" bore, 11" stroke; 5" bore, 11" stroke; 5"

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tool, and the latter would not be used until a new run is started.

Next, the "T"-order pouch is returned to the Inspection Department where it is filed in numerical order until withdrawn by the inspector called upon to check performance by the warning tag on a tool. After the tool has been found to perform within specifications, the "T"-order is again signed and dated and delivered to Cost Accounting, where the job order sheet is closed out and actual cost is determined and entered.

The final step is the return of the order to the tool engineer who can now compare estimates with actualities. He can also complete his tool recordsstarted at the onset of his job-as to date effective, cost, and location. The Tool Manufacturing Order, or "T"order, has now fulfilled its purpose and may be destroyed or filed away. The tool record, as shown in Fig. 3, will preserve all pertinent data and acts as a complete index of all tooling. It will show at a single glance the necessity of rework of some tools due to engineering or design changes, and will provide history, value, location, and the latest revision number.

Production is based on tooling, and cost is dependent upon tools. Well-kept records pay off.

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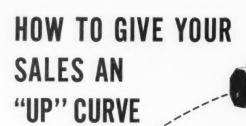
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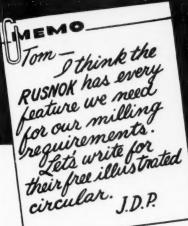
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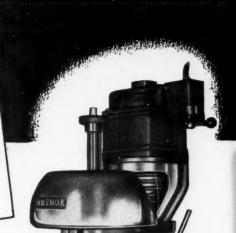
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# Reducing Cost of Drophammer Dies

An outline of tooling techniques employed in West Coast plant for increasing economy of drophammer production.

By FRANK CHARITY

BY modifying and improving war-born tooling techniques, engineers at Stainless Steel Products, Inc., Burbank, Calif., have reduced the overall cost of drophammer production by a margin exceeding 25 per cent. The tooling techniques in this case are those which specify the use of Kirksite "A," an aluminum-zinc alloy, for the casting of drophammer dies. These techniques were initially developed during World War II for the aircraft industry. and Stainless Steel's improvements have been such that it is now possible to use the Kirksite dies to produce stampings from 34-inch steel plate, the gauge of which is greater than that of most of the aluminum and magnesium alloys which were previously stamped with similar dies for aircraft production work.

The purpose of the tooling is to facilitate "job shop" drophammer production for the western aircraft industry, utility and appliance factories, automotive manufacturers, and so on. Operations are performed in some 30,000 square feet of plant space with complete pattern shop and foundry facilities, a battery of nine rope-type drophammers and accessory machine tools, and some of the most modern types of equipment for welding, heat treating, and so on.

Tooling patterns are economically produced by casting or modeling Hydrocal, a gypsum or plaster compound. The casting technique is utilized where precision made mockups or masters are available, since Hydrocal expands after setting so as to compensate for the shrinkage that will take place when the Kirksite alloy is cast. Modeled patterns are made by: (1) cutting metal templates to represent transverse cross-sections of an article or part; (2) assembling the templates on a plywood or similar base to represent the overall contours of an article or part; (3) fairing in the template assembly with Hydrocal and reinforcing fiber fillers; and (4) removing surplus plaster before it sets with a steel straightedge or curved scraper, so that the hardened plaster will require no more than a light sanding operation before it is finished.

Modeled patterns are usually made approximately 0.140 inch oversize to allow for Kirksite shrinkage, and both modeled and tooling patterns are dehydrated by heating to temperatures of 125 to 150 deg. F. for approximately two hours after the plaster therein has set. The patterns are then covered with several coatings of shellac.

In some instances, both male and female die patterns are made so that Rope-type drophammers of the type shown herewith are used to produce stampings.

duplicate sand molds and casts can be produced with optimum speed. Such patterns are generally made by facing the punch pattern with wax (thickness of which represents the thickness of the metal to be stamped) so that the mating tool pattern can be cast thereon with Hydrocal. Where mated patterns are not required, cast Kirksite punches are similarly used as molds for casting mating tools.

Patterns are dimensioned so that the draft on outer vertical walls will be no greater than the draft on inner vertical walls, otherwise it would be a difficult operation to separate the patterns from their sand molds. A draft of 3 degrees is normally used in cavities which are no more than 6 inches deep; however, deeper cavities may have as little as 1 degree draft.

Where very large tools are required, hollow patterns are sometimes made over wood frames, wire mesh, steel reinforcements, or similar members in order to conserve materials and reduce the amount of weight that must be handled.

Lifting eyes, rather than lag screws, are inserted in all patterns with reference to the center of gravity so as to minimize the amount of distortion that can be anticipated in removing patterns from sand molds.

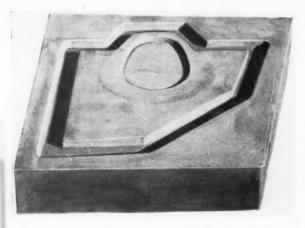
Sand-mold cores for casting Kirksite "A" may be made in accordance with standard practice from virtually all conventional coring compositions, with or without preliminary baking. However, coring is not used as a method



of saving materials in drophammer dies since resultant difficulties may exceed the cost of "saved" Kirksite by a vast margin. Even buttressed dies cannot be cored to any extent, due to the cold-flow characteristics of all zinc alloys.

Fine-textured molding sands with about 30 per cent clay and 5 per cent moisture are used in making molds. The flasks for the molds are constructed of heavy lumber which is mortised at the joints. Trunnions are centered at the ends so that the flasks may be inverted without damaging the molds therein, and each flask is clamped to its follow-board with screw attachments.

Open-type molds are normally made, and the minimum clearance between pattern and flask surfaces is three



This illustration shows a plaster pattern ready for use in making a sand mold.

inches. Talcum and Pearl Brand Partene have both been satisfactorily used as pattern-mold parting agents, and the sand is normally tamped in place with manual tools. Vents are non-essential, as a rule, but may be made with  $\frac{1}{16}$  or  $\frac{1}{16}$ -inch wires before molds

and patterns are separated if necessary.

Inverted molds are leveled in both directions with wood wedges, and sand adjacent to each pattern is compacted and smoothed to a slight bevel with a "slick." Light rapping is then generally

sufficient to separate the pattern from its sand mold when the pattern is lifted vertically.

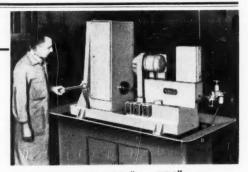
Defects in the mold cavity are repaired, when necessary, and excess sand particles are removed from the mold by means of a suction pump. Sub-

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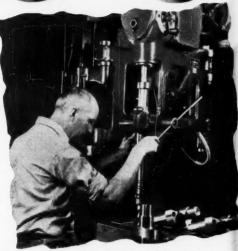
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A plaster pattern is "cleaned up" prior to use in making sand molds.

sequent graphiting and skin-drying operations are not employed, and castings are generally gated at one point only.

Inserts such as nuts and bolts are often cast in Kirksite dies, but chills are used with marked infrequency where draw marks must be prevented. Small sand cores, built up on twentypenny nails, are used to create tooling holes which can facilitate the use of lift pins for handling solidified Kirksite dies.

Kirksite "A" is melted in a circular Knapp furnace, which has a total capacity of five tons and is equipped with a Leeds and Northrup Micromax controller-recorder. Controls are adjusted for constant temperature of 800 deg.

F., at which temperature Kirksite will remain indefinitely molten without appreciable oxidation or segregation, and no stirring is required before casts are made.

The molten allov is ladled from

the furnace with manual containers, 50 lb. at a time, and loaded molds are skimmed with slightly-dished discs made from wrought iron for a thickness of about ½ inch and profusely drilled with ¼ and ¾-inch holes. Surplus molds are provided for skimmings and to form pigs when the furnaces are emptied.

Properly-made Kirksite castings have about 37,800 p.s.i. ultimate tensile strength, 60,000 to 75,000 p.s.i. compressive strength, 34,000 p.s.i. shear strength, 6.7 specific gravity (or 432 lb. weight per cubic foot), a Brinell hardness value of 100, and 4 footpounds Charpy impact strength (for 14-inch bar specimens). Casts can be quenched for greater strength and

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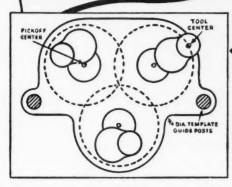
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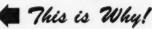
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# POSITIONING

— machined for desided hole patterns are applied on posts extending from housing. Locking templates assure stability of set-ups, eliminate shifting during long runs. Adopters provide for vertical adjustment of tools.



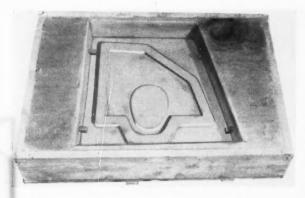
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This sand mold was made from the plaster pattern shown in an accompanying illustration.

plant at this writing is to allow enough bottom thickness in the casts to permit flattening with a planer or boring mill after solidification.

A ½-inch asbestos board is used to cover each sand mold as soon

as pouring operations are complete in order to prevent "freezing" with resultant strains and distortion. Nevertheless, a few dies are slightly warped after they are removed from the sand molds and must be straightened with a hydraulic press using the following procedure: (1) supporting the die ends on blocks and preheating to about 350

hardness; however, the latter properties are subject to gradual reduction with age.

Flat die bottoms have been attained by using an oxyacetylene torch or by filling in Kirksite castings in several pouring stages before sand molds were completely loaded. However, the general practice in the Stainless Steel

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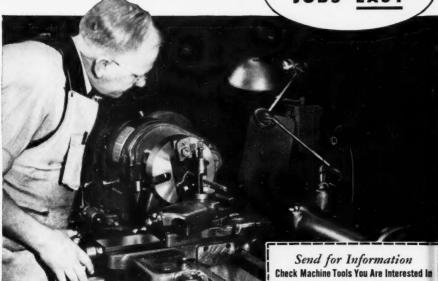


New Lincoln 200 amp. "Fleetwelder" with exclusive "Arc Booster." Ideal for production,maintenance, sheet metal, garage repair, job welding.



South Bend Lathes (

MAKE TOUGH



Close tolerances come easy with South Bend Lathes. The accuracy of these precision-built lathes make routine the machining of exacting work. And it is practically without effort, for their operation is simple, easy and smooth.

You'll also find that their versatility is a big help in simplifying tough jobs. The wide ranges of spindle speeds and turning, facing, and thread cutting feeds keep machining efficient. Set-ups can be readily made for awkward jobs. Practical attachments available for various classes of work often eliminate the need for special fixtures or machines.

It will pay you to find out about South Bend Lathes if you want to cut machining costs on both your tough and easy jobs.



**Building Better Tools Since 1906** 

SOUTH BEND LATHE

14-1/2" PRECISION LATHES



BENCH LATHES

TURRET LATHES





7" SHAPER

14" DRILL PRESS

Zone

10", 13", 16", 16/24" PRECISION LATHES
LATHE TOOLS AND ATTACHMENTS

TIME PAYMENT PLAN

Name

Street

State

deg. F., (2) pressing on a single block on the high point to about  $\frac{1}{16}$  inch per foot of span between supporting blocks and below the desired permanent shape, and (3) leveling the die bottom with a planer. On large or heavy dies, pressure may be maintained as noted above for several days in order to obtain the desired flow.

Slight defects on cast Kirksite dies, such as draw marks, can usually be repaired without difficulty by means of a gas-welding torch; and it is not generally necessary to polish the die surfaces with an abrasive disc, as has been the practice in aircraft work, since the surfaces will become adequately smooth as soon as a few steel stampings have been made thereon.

Drophammer punches for Kirksite dies have been made from impact-resistant plastics and a variety of alloys, including Kirksite "A." However, Stainless Steel engineers normal-

> ly prefer antimonial lead compositions for punch - casting purposes since these compositions, in turn, facilitate the use of Kirksite dies as masters.

Dies are prepared for use as masters by fitting to templates and polishing with emery discs on flexible - shaft grinding equipment. Following this a "fence" comprising sheet metal or plywood covered with asbestos cloth is built up around each die to serve as a retainer for the punch casting material. Weights and clamps are used to brace the retaining walls, and fillets for internal corners are made with a stiff paste comprising one part fireclay in three parts lard oil and one part



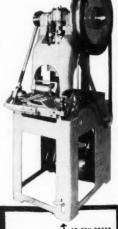
# with DIEBEL H1-SPEED AUTOMATIC PRESS & DIE\*

Production was boosted from 52.000 pieces to 95.000 pieces per day. Maintenance charges were reduced and floor space requirements cut. Costs were permanently lowered and a better competitive position reached. This is what a manufacturer accomplished by replacing conventional equipment with our Hi-Speed Automatic Press.

Ask Us What We Can Do For You

\*Die designed and built in
our modern tool room.

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# TUKON for Micro-Indentation Hardness Testing

Wilson now offers 3 models for use with either Knoop or 136° Diamond Pyramid Indenter.

Model MO—Mechanically operated—simple, economical. Bench or floor type. Applies loads from 1 to 1000 grams.

Model FB—Fully automatic—most popular model. Applies loads from 10 to 3600 grams.

Model LR—"Long Range" model the ultimate in hardness testing. Applies loads from 10 to 50,000 grams.

SEND FOR BULLETIN OF INFORMATION

Made by WILSON, manufacturer of "ROCKWELL" Hardness Testers and "ROCKWELL" Superficial Hardness Testers.



# WILSON

MECHANICAL INSTRUMENT CO., INC.
AN ASSOCIATE COMPANY OF AMERICAN CHAIN & CABLE COMPANY, INC.

230-G PARK AVENUE, NEW YORK 17, N. Y.



TABLE I

Percentage of Antimony	Melting Temp., F.	Brinell Hardness	Tensile Str., p.s.i.	Elongation Percent in 2 Inches
4	572	10.1	5660	22
6	545	11.8	6840	24
8	518	13.3	7420	19
10	495	14.6	7670	15
12	479	15.0	7480	12
14	496	15.3	7000	9

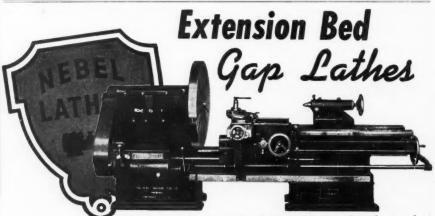
kerosene. The fillets prevent runouts when casts are made.

Lead alloys can be cast at melting temperatures of more than 600 deg. F. to produce mated punches on cast Kirksite dies, providing the poured metal is distributed over the entire die face so as to prevent "washing" or melting. Alloys that have been used in such work are listed in Table I.

The first three of these alloys are considered most practical for the casting of a majority of drophammer punches.

Kirksite ''A'' punches are used for work which must be performed with the hardest and heaviest gauges of steel;

and, if no plaster punch pattern is available for use in making a sand mold, the Kirksite punch is cast on a Kirksite die by coating the latter with a heat-resistant mixture comprising equal parts of whiting, silica flour, and water. The latter mix may be thinned with additional quantities of water so that it can be applied in layers with a spray gun until the die coating has as



Illustrated is the Series "AG" 20/40" Extension Bed Gap Lathe. Also made in 28/50" Heavy Duty.

The Extension Bed Gap Lathe is designed to be used either as a gap lathe or an engine lathe. We also manufacture a line of regular geared head engine lathes. Write for circulars.

# Are you missing this cost saving?

# SOME OF YOUR COMPETITORS ARE USING LUSOR

AND USING LESS TOOLS AND IMPROVING THEIR EMPLOYEE RELATIONS



10 million gallons of Lusol solution used in exhaustive testing and practical plant applications, have proved, and in important places, that Lusol as a coolant completely revolutionizes thinking on machine speeds, tool life, and production

### BASED ON A NEW CONCEPT

Lusol depends upon cooling rather than lubrication at the point of tool contact. Lusol makes possible up to 300% to 400% greater speeds, less tool wear, less tool breakage, finer finish and lower cost production.

# LUSOL IS GOOD EMPLOYEE RELATIONS

Operators like Lusol because it is a clear, clean solution, like a mild soap. Those who work with their hands in old type coolants all day long have often suffered from skin eruptions. Lusol does not cause skin irritations. Clothes and shoes are kept cleaner - the machines are

clean, the work is clean, the shop is clean. This clear solution allows the operator to see the work as the finest drill comes down to the work piece, perfect vision, less operator fatigue. Lusol means longer tool life, fewer tool changes, less wheel dressing; easier, faster, smoother production without increased effort. Of course, operators like it, and we've never found one yet who would be willing to go back to the "old way."



275% greater production per broach grind

COLONIAL VERTICAL BROACH Metal: No. 3140 Steel Forging Operation: Broach Tank Track Cap Ordinary Cutting Oil: 2400 pieces per broach grind Lusol: 9000 pieces per broach grind

GRINDING OPERATIONS 23 more pieces per wheel dressing

MATTISON SURFACE GRINDER Metal: No. 3140 Steel Finish grind .02" from Operation: chuck jaw Ordinary Soluble Oil: Wheel dressing every 7 pieces Lusol: Wheel dressing every 30 pieces

# DRILLING AND TAPPING

Saved 165 drills

MORRIS SPECIAL ROTARY DRILL

Metal: SAE 1035 Steel Forging Operation: Drill 2 11/16" holes in connecting rod cap Ordinary Cutting Oil: Replaced 170 drills per week Replaced 5 drills per week

### MORE EVIDENCE

### MACHINING

Machining a No. 347 Stainless Steel forging on a Warner-Swasey 3A Larhe, with soluble oil, required three tools to make cut 2-5/16" deep, and change of shovel nose tool after each piece. Now, using Lusol 40-1, the deep cut is made with one tool, and six pieces are produced per shovel nose tool. Savings are obvious, since twenty-five mi idle time is required for each compl tool change.

### MILLIMA

A Cincinnati Miller removed ½" stock from two sides and cut a groove 2" x 134" down the center of one side of a long bar of NE 3749 steel. With soluble oil 20-1, four pieces per cuntergrind were produced, with heavy smoking. After changing to Lusol 40-1, nine pieces are produced without smoke before regrinding of tools.

Tools used on a Warner-Swasey 2A to bore and face a cluster gear forging required regrinding every four hou when cooled with a soluble oil. Wi change to Lusol 40-1, tool life is i creased to sixteen hours, machine runs at maximum speed, production increased

CASE HISTORIES YOU CAN'T AFFORD TO OVERLOOK

LUSOL SAVES TOOLS & SPEEDS WORK	F. E. ANDERSON OIL COMPANY 228 Brownstone Ave. Portland, Conn. Please send me your case history material on: Broaching Drilling, Tapping Grinding Name
CUTS COST	Company
Cols Cost	Address
NATIONAL DISTRIBUTION WAREHOUSE STOCKS	

much thickness as that of the material which will be formed thereon.

Worn or obsolete Kirksite punches and dies are almost 100 per cent reclaimable by melting; and in the Stainless Steel plant, no effort is made to break or cut the dies into small pieces prior to reclamation work since it has been found that entire tools will melt readily if there is a heel of molten alloy in the furnace.

No fluxes are required in remelting alloys which are not contaminated with foreign matter; however, scraps, such as borings, are usually reclaimed by melting in a molten alloy heel at a temperature of about 900 deg. F. with a flux comprising sal ammoniac and zinc chloride. The latter causes foreign matter to rise to the surface when the molten mix is stirred vigorously and allowed to cool to about 775 deg. Fahr-

enheit.

With Kirksite and antimonial lead tooling as described in this article, the Stainless Steel organization has been producing 10,000 to 15,000 stampings per month. Many of those required progressive die operations with intermittent annealing, and at least a few involved the forming of sheet or plate stock at elevated temperatures.

Production life of the dies was, of course, variable, depending on the type of stock that was used and the design specifications that prevailed in each individual case. However, it was found that several thousand stampings could be made with a single set of dies before new tooling was required;



3946 WEST ELEVEN

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MICHIGAN

# BARNESDRIL No. 4 MAGNETIC

No. 4 MAGNETIC COOLANT SEPARATOR

# SAVES \$104.42 PER WEEK

FEWER WHEEL DRESSINGS

EASIER CUTTING ACTION

IMPROVED WORK FINISH

LESS TOOL RECONDITIONING

# CALCULATED SAVINGS PER WEEK

Cost With

EPARATOR	SEPARATOR
MACHINE PRODUC	TION LOSS \$2,25
OPERATOR PRODUC	
CLEANING C	OSTS

14.10 COOLANT COSTS 1.06 \$4.28

12.10

\$108.70 PER WEEK - \$104.42



on No. 3 Cincinnati Centerless Grinder

Barnesdail Magnetic Coolant Separators save money. Compare these operating, cleaning and coolant costs listed in the adjoining table. Besides the actual dollars saved, production savings are also made in wheel life, cut-

ting action, tool repair and quality finishing. Similar real savings can be made in your shop with this modern sludge removal method. Telephone a BARNESDAIL Engineer today for the complete story.



**Gree** Catalog and additional Data Sheets: Check the savings that can be made on your Grinding, Honing, Shaving or Shaping Operations. Get a Copy now. Ask for Bulletin B300E.

BARNES DRILL CO.

BES CHISTNUT STREET BOCKFORD ILLINGIS U.S.



A sand mold is readied for use in casting a stamping die.

and that, in some rather exceptional cases, two sets of identical dies could be made for less than the cost of a single set of dies which might have been cast or otherwise fabricated from alloys other than Kirksite.

Furthermore, it was learned that many dies which became worn or damaged in use could frequently be repaired for additional service by using gas welding equipment and cast Kirksite welding rods of ½, ½, ¾, and ½-inch diameters as follows: (1) preheating the die to 300 or 400 deg. F., (2) pud-

dling molten metal on the surface to be repaired, (3) breaking the oxide skin of the puddle with Kirksite welding rod, and (4) using a stroking motion of the welding torch to extend the molten area of the puddle along the surface to be repaired, while moving the rod in the direction of the weld.

In a sense, this is a reversal of the usual practice in welding; and, in addition to permitting repairs, it has enabled welders to make slight engineering changes in the company's stamping dies.

# LUERS

# PATENTED CUTTING OFF TOOL HOLDERS PATENTED CUTTING OFF BLADES

ONLY the PATENTED construction of LUERS cutting off BLADES permits normal expansion of bursting chips — MEANS MAXIMUM CUTTING EFFICIENCY.

Manufactured by

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For service it's Standard

Coast to Coast

To serve you well we must provide prompt, accurate and reliable service in delivery of the types of tools you need at the time you need them.

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Our trained service staff with the accumulated knowledge of 69 years experience in metal cutting problems can help solve your tough problems—no cost or abligation. Write us.

We'll welcome you at Conference Booth No.'s 907-908, Industrial Supply Convention, Public Auditorium, Atlantic City, New Jersey, May 22-23-24.

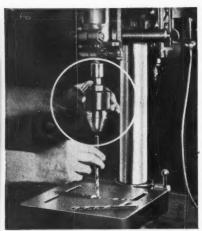
STANDARD TOOL (O. CLEVELAND 4, OHIO

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THE STANDARD LINE: Drills - Reamers - Taps - Dies - Milling Cutters - End Mills - Hobs - Counterbores - Special Tools

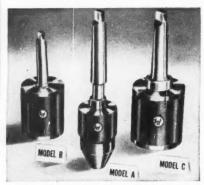


# Change drills in a second, safely with this Automatic Chuck while spindle is running



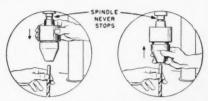
AMF Wahlstrom Chucks are rugged tools, proven out in many years of heavy production work. Simple construction assures ease of operation.

### THESE WAHLSTROM TOOLS CUT COSTS, TOO



Wahlstrom Chucks are available in several size ranges: Model  $A-1/32^{\circ}$  to  $1/2^{\circ}$ ; Model  $AA-1/64^{\circ}$  to  $3/8^{\circ}$ . Model  $B-15/64^{\circ}$  to  $1/2^{\circ}$ ;  $3/8^{\circ}$  to  $3/4^{\circ}$ ;  $17/32^{\circ}$  to  $1^{\circ}$ . Model C-Holds any size tool with No. 1, 2, or 3 M. T. Shank.

#### HERE'S ALL THERE IS TO CHANGING DRILLS



Insert new drill—push up tapered part—drill is locked in place.

You don't step the machine to change drills with the AMF WAHLSTROM CHUCK. No keys, collets or wrenches are needed.

That's why Wahlstrom Chucks cut costly minutes in changing tools for drill press work or for spotting, drilling and reaming in boring or milling machines. They'll also save money in lathe work for burring, turning, filing, etc. One spindle does the work of several.

Tools last longer, too...smooth, hardened and ground jaws grip tight without chewing into tools. Grip increases with the load.

For fast, uninterrupted production, use the quick-change AMF WAHLSTROM CHUCK. It is the only fully automatic drill chuck which holds the widest range of straight shank tools... Model A-1/32" to 1/2"; Model AA-1/64" to 3/8"

See your local distributor or write today for Bulletin 56-1.

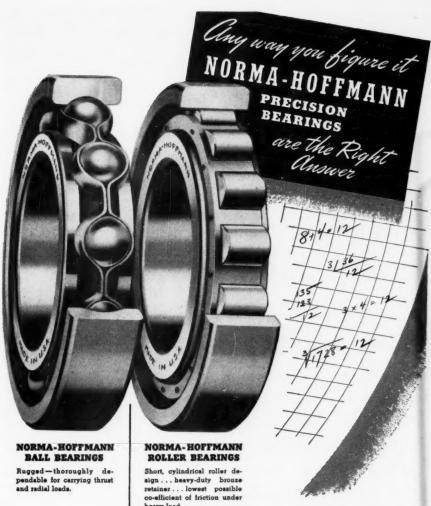
WAHLSTROM TOOL DIVISION, AMERICAN MACHINE & FOUNDRY CO.
5502 SECOND AVENUE BROOKLYN 20, N. Y.

WAHLSTROM fully automatic

**DRILL CHUCKS** 

NO KEYS, COLLETS OR WRENCHES





heavy load.

Norma-Hoffmann heavy-duty Bearings improve the design and performance of products wherever they are used. They are dependable, give friction-free

smoothness and quietness of operation. Available in a wide range of sizes for every load, speed and duty. Write for catalog and engipeering assistance.

### NORMA-HOFFMANN Precision BEARINGS BALL . ROLLER . THRUST

NORMA-HOFFMAN BEARING CORPORATION STAMFORD, CONNECTICUT FIELDOFFICES: Chicago, Cleveland, Detroit, Cincinnati, Los Angeles, San Francisco, Dallas, Seattle, Phoenix

# Uncle Sam Would Like To Do Business With You

Information of vital importance to business men who are interested in bidding on military and civilian procurement contracts of the U.S. Government.

By ROBERT M. LUCKEY
District Manager, U. S. Department of Commerce, Cincinnati

IN order to provide all American business men an equal opportunity to compete for military and civilian procurement contracts, the Department of Commerce has developed a co-operative program with the Departments of Defense and the General Services Administration. This program is designed to provide for the quick transmission of procurement information direct from fifty-five major Army, Navy and Air Force purchasing offices in the Field and in Washington.

The procurement information from these purchasing offices will be sent air mail each day to the fourteen regional offices of the Department of Commerce. These offices will prepare a consolidated synopsis of each invitation to bid as it is approved and will distribute the informaton to the District Offices of the Department of Commerce and approximately 100 Cooperative Offices, including information centers in the thirty-five unemployment areas known as "E" areas.

The information includes a brief but adequate description of the items to be

purchased, quantities to be purchased, the invitation number and place and time of bid opening or issuance. A copy of the full bid request may be obtained by writing the originating military purchasing office.

In the case of the Defense Department bid information, the General Services Administration will also make available information on proposed purchases of over \$500 to be made through formal bid and award procedures. Daily information will also be released covering anticipated purchases under \$500, but not less than \$100, so that information on small lot purchases will be available near the supply centers where purchases are to be made.

Federal Supply Services open market purchases total approximately \$50,000,000 a year, and stock replenishment purchases made in Washington and in the Field total approximately \$90,000,000 annually. Term contracts calling for indefinite quantities for a definite period of time on items listed in the Federal Schedules total approximately \$100,000,000 a year.

# UNITED EXTRA HOLDING POWER of MAGNA-LOCK Magnetic Chudis

### THE MACHINE

developed by Clair Manufacturing Co., Inc., of Olean, New York, for finishing back edges of kuife blacks, pocket knife spring backs, plier sections, large open-and wrenches and similar items.





### HOW WORK IS HELD

by MAGNA-LOCK Chucks Clair Surface Finding Machines take profitable advantage of the entre holding power of any MAGNA-LOCK Chuck 200 wide, 8" to 14", geep. Rough glaze to mirror fishes are obtained.

### RESULT

Again MAGNA-LOCK Churces eliminate need for the usual costly holding factures, save hours of set-up time. MAGNA-LOCK'S extra holding power permits greater finishing accuracy on even smallest pieces. And because its typ pipe is integrated of the extreme edges, more pieces can be leaded, at a firm

Manchett MAGHA-1702 CORPE NATOR

Specific and speci

### Ges ell the

and you'll go RAS'S LOCK— For to increase your macking's preductivity. White today to Deal MM-SS

Do you have informatible on the new has politically netorial en your thinks the teleprical The Department of Defense states that the military purchasing offices will continue to maintain the lists for the mailing of bid invitations or of advance notices of such invitations to bona fide manufacturers and dealers.

Following is a list of the Department of Commerce offices where consolidated synopses of invitations to bid will be available daily for the businessman to review:

Albuquerque, N. Mex., 203 W. Gold Ave.

Atlanta 1, Ga., 50 Whitehall St.
Baltimore 2, Md., 103 S. Gay St.
Boston 9, Mass., 2 India St.
Buffalo 3, N. Y., 117 Ellicott St.
Butte, Mont., 14 W. Granite St.
Charleston 3, S. C., 18 Broad St.
Cheyenne, Wyo., 304 Federal Office Bldg.

Chicago 4, Ill., 332 S. Michigan Ave. Cincinnati 2, Ohio, 105 West Fourth St. Cleveland 14, Ohio, 925 Euclid Ave. Dallas 2, Tex., 1114 Commerce St. Denver 2, Colo., 828 Seventeenth St. Detroit 26, Mich., 230 West Fort St. El Paso 7, Tex., 206 U. S. Courthouse Bldg.

Hartford 1, Conn., 135 High St. Houston 14, Tex., 602 Federal Office Bldg.

Jacksonville 1, Fla., 311 W. Monroe St. Kansas City 6, Mo., 911 Walnut St. Los Angeles 12, Calif., 312 North Spring St.

Louisville 2, Ky., 631 Federal Bldg. Memphis 3, Tenn., 229 Federal Bldg. Miami 32, Florida, 36 NE. First St. Milwaukee 1, Wis., 517 E. Wisconsin Ave.

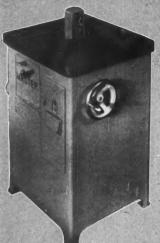
Minneapolis 1, Minn., 401 Second Ave., South.

Mobile 10, Ala., 109-13 St. Joseph St. New Orleans 12, La., 333 St. Charles Ave.

New York 4, N. Y., 42 Broadway. Oklahoma City 2, Okla., 102 NW. Third St.

Omaha 2, Nebr., 1319 Farnam St.

# Presenting MASTER PROFILE GRINDER



Two Speeds Large Table Guarded Wheels Tilting Spindle
Dust Collecting Facilities
Oscillating and Non-Oscillating

The Master Profile Grinder is an entirely new development in the metal grinding field. A tilting spindle with an incline range of from 90° to 60° is the outstanding feature. The table is constantly in a horizontal position. A precision protractor, read by means of a dustproof lighted periscope from the top of the table, permits setting to within one-quarter of 1°.

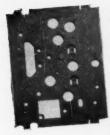
The large cast iron alloy heat-treated table measures 24" x 25".

Write today for complete information on this outstanding grinder. It can do close, accurate work quickly on a wide range of metal working jobs.

Dealer inquiries invited, foreign and domestic.

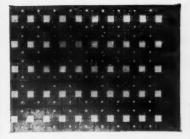
## THE KINDT-COLLINS CO

12650 ELMWOOD AVE., CLEVELAND II, OHIO



PIERCING TIME PER PIECE AS SHOWN 3 min. 50 sec.

Complete lot of 500 2 Handling Operations Size 8%" x 10½" x .047 steel



PIERCING TIME PER PIECE AS SHOWN 25 min. 48 sec.

Complete lot of 21 One Handling Operation Size 17%" x 24" x 16 ga. cold rolled steel 90 blanks sheared from each sheet



AFTER FORMING -

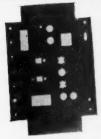




PIERCING TIME PER PIECE AS SHOWN

1 min. 53 sec.

Complete lot of 20 One Handling Operation Size 18" x 38" x 34" steel



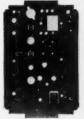
PIERCING TIME PER PIECE AS SHOWN 3 min. 35 sec.

Complete lot of 200 1 Handling Size 13 %" x 20 %" x .047 steel



PIERCING TIME PER PIECE AS SHOWN 6 min. 28 sec.

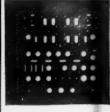
Lot of 176 3 Handling Operations Size 8%" x 14" x .047 steel



PIERCING TIME PER PIECE AS SHOWN 5 min. 43 sec.

Lot of 1374 3 Handling Operations Size 8 % " x 14" x .047 steel

pieces of panel A, engineering changes were made and incorporated in template changes. Production was completed on Panel B. Panels A and B are somewhat similar. After producing 176



PIERCING TIME PER PIECE AS SHOWN

6 min. 58 sec.

Complete lot of 100 1 Handling Operation Size 201/2" x 201/2" x 1/4"

Here's the reaso

We have developed a new and almost unbelievably fast gauging method, in combination with our Turret Punch Presses, featuring a radically different and simple approach to high speed gauging and piercing. Check the above time studies of actual jobs and you'll

see why this method is a major advance in the profitable production of flat piercing operations in lots of 2500 or less. Send in the coupon for the simple, direct facts.

WIEDEMANN MACHINE CO. 4219 WISSAHICKON AVENUE

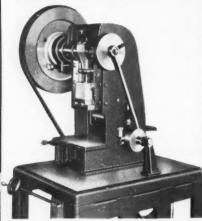
PHILADELPHIA 32, PENNA.

Please send me complete information on your new Turret Punch Press and Hi-Speed Follower Gauge.

Title

### NEW

## Outstanding Addition to AUTOMATIC FLEXOPRESS LINE



### 4

### 12 TON PRESS

The success of the Automatic 1½ to 2 ton press prompted many inquiries for a larger press. Now we can announce the addition of the new 12 ton press to our standard line. High speed, completely automatic and capable of cutting materials in lengths up to 12".

### 1 1/2 TO 2 TONS

The 1½ to 2 ton press completely automatic. Can produce 9,000 to 40,000 pieces per hour. Capable of cutting materials up to 9".



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Philadelphia 2, Pa., 437 Chestnut St. Phoenix 8, Ariz., 234 N. Central Ave. Pittsburgh 19, Pa., 700 Grant St. Portland 4, Oreg., 520 SW. Morrison St. Providence 3, R. I., 24 Weybossett St. Reno, Nev., 118 West Second St. Richmond 19, Va., 801 E. Broad St. St. Louis 1, Mo., 1114 Market St. Salt Lake City 1, Utah, 350 S. Main St. San Francisco 11, Calif., 555 Battery St.

Savannah, Ga., 125-29 Bull St. Seattle 4, Wash., 909 First Ave.

In addition to the foregoing list of Chamber of Commerce offices where procurement information will be available, business men interested in bidding on military and civilian procurement contracts of the U. S. Government may also contact the following principal purchasing offices of the Army, Navy and Air Force;

### ARMY PURCHASING OFFICES

Chief, Publishing Section, Army Publication Service, Adjutant General's Office Washington 25, D. C.

Chief, Chicago Procurement Office, Corps of Engineers

226 West Jackson Blvd. Chicago 6, Illinois.

Division Engineer, South Atlantic Div. Corps of Engineers, P. O. Box 1889 Atlanta 1, Georgia

Attention: Chief, Lumber Branch District Engineer, Portland District Corps of Engineers, 628 Pittock Block

Portland 5, Oregon Attention: Chief, Lumber Branch

Commanding Officer, Marietta Transportation Corps Depot Marietta, Pennsylvania

Oakland Q.M. Purchasing Office Oakland Army Base Oakland, California

Commanding General, New York Quartermaster Purchasing Office, 111 East 16th St.



### ARMY PURCHASING OFFICES

Quartermaster Supply Officer Columbus General Depot

Columbus 15, Ohio

Commanding Officer
Chicago Quartermaster Purchasing
Office

1819 West Pershing Road Chicago 9, Illinois

Commanding Officer

Chemical Corps Procurement Agency

Army Chemical Center, Maryland

Commanding General

Aberdeen Proving Ground Aberdeen, Maryland

Commanding Officer, Detroit Arsenal Centerline, Michigan

District Chief, Detroit Ordnance District

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Cutting Hard-Tempered

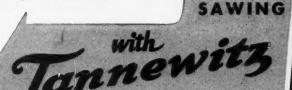
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Sawing 16" Steel Piling

PRICTION sawing with Tannewitz High Speed Band Saws results in perfectly amazing time savings in the cutting of flat sheets of soft or hardened steels, non-ferrous metals, armor plate, glass, plastics, many other materials and the trimming of castings. For cutting formed parts there's nothing to compare with it. The downdrag of the saw is so negligible that parts may be trimmed or sawn as desired without using a rest of any kind. Whatever your cutting requirements, chances are they can be handled faster and at less cost with Tannewitz High Speed Band Saws.

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HIGH SPEED BAND SAWS

FRICTION



Every shop needs a SHOPLIFTER. Saves men, saves materials. Besides handling heavy dies, the SHOP-LIFTER can stack drums and boxes, unload street trucks, pick up skids and be used as an adjustable height table.

All steel, arc welded frame. Easily operated hoist unit with automatic brake, safely holds load at any height

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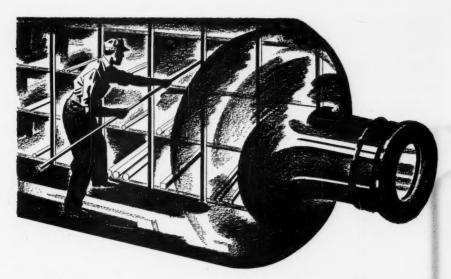
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. . IN YOUR PLANT?

Do you have production interruptions due to running out of steel bar and shafting stock? Is your production cramped—with too much capital frozen in stock? These are common bottle necks—easily broken.

Close out your own steel bar stockpile. Use instead your Union Drawn Distributor's larger, more complete, more diversified, faster-turning stock—as your production supply line. His delivery is fast . . . as you need it—a bar at a time or a truckload—and he has exactly what you want.

To break this bottle neck-all you need is his stocklist. Phone him for your copy today!





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- Concentric tapered to fit holes .0012 smaller than gage size.
- 11/2" in length for easy insertion
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Letter sets of 52 gages, A-Z in pairs
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Individual gages in stock
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### CHICAGO STEEL PRESS BRAKE

Model No. 131



A new member of the Chicago Press Brake family designed to supplement the larger machines.

Within its rated capacity (11 tons) all operations are handled same as on the larger machines.

All steel construction, enclosed gearing.

Takes up small floor space.

We can make excellent deliveries of this new press.

We make complete line of dies for all Press Brakes.

Send for Bulletin 131 for further description

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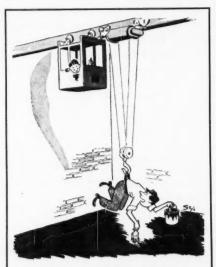
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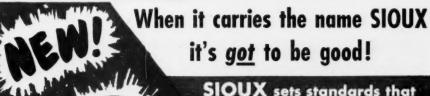
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2" CAPACITY ELECTRIC HAND SAW

### SPECIFICATIONS

SHOWING ONE HAND OPERATION

SAW BLADE: 61/4" diameter, 5/8" hole.

DEPTH OF CUT: 2" in wood. BASE ADJUSTMENT: Vertical Oto 2". BEVEL CUTS: 0 to 45 degrees, depth

BEARINGS: Ball and Roller Bearings throughout.

HELICAL GEARS: Heat treated alloy steel.

SWITCH: Double Pole, Momentary

-Safety. SAFETY GUARD with Spring Re-

turn.
BLOWER keeps line of cut free of sawdust.

CLOSE COUPLED design for convenient one-hand operation.

Net weight, 141 lbs.

No. 1901 SIOUX SAW complete with Case. Equipped with Combination Blade and Wrench.



### SPECIAL FEATURES

- Modern Design
- Helical Gear Drive
- · Permanently Lubricated
- · Sturdy, Powerful
- Light, Dependable
- Angle and Depth Adjustments
- Adjustable Rip Scale Guide
- Perfect Balance
- True One-Hand Operation
- Standard Round Hole Blades
- Exceptional Performance
- The Carpenter and Builders' General Purpose Saw



SAW COMPLETE WITH CASE

Sold only through Authorized SIOUX distributors

STANDARD THE



WORLD OVER

# Large Volume Chip Removal System

By GRAYDON R. MACE

THE question of efficient swarf, or chip, removal is not always as simple as merely cleaning up around the machines in the shop once or twice

each day. As a matter of fact, with some modern machines, the amount of chips produced is so great that their removal and separation from the coolant governs, to a large extent, the entire layout and arrangement of the machine shops.

One example of the necessity of removing a large amount of chips may be found in the spar cap department at the El Segundo plant of the Douglas Aircraft Co. Swarf removal from this department requires the handling of approximately 65 tons of aluminum

alloy chips during each eight-hour shift. A spar cap is a main beam in an airplane wing, and it is machined from a solid bar of aluminum to the shape



Fig. 1-An aluminum spar cap.

shown in Fig. 1. The complexity of the spar cap shape and its many contours often requires the removal of more than 50 per cent of the bar material during the machining operations.

In order to facilitate the removal of the huge amounts of chips which are

produced, the various special machines, which are used to perform the required operations on the spar caps, are arranged in a straight line; and parallel to the machines, a drain trough, running the entire length of the department, is built into the floor. Chips are

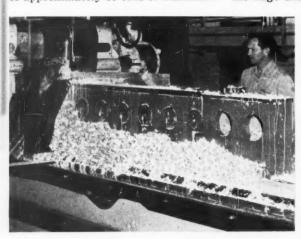


Fig. 2 — This illustration shows the amount of chips produced on a typical cutting operation.

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## ABRASIVE BELT MACHINING

Does More Surfacing Jobs FASTER and BETTER

Features high speed cutting by millions of abrasive points imbedded in a continuous belt, cooled and cleaned by water and other coolants. Does close tolerance work on flats, squaring, cylindrical surfacing; deburrs, knocks off corners, forms radii, bevels and other operations. Often does milling, shaping, grinding operations 10 times faster—saves 75-90% set-up time.



#### AUTOMATIC FEED

Model BG-8 (with automatic feed table). A precision surfacing machine for repeat operations. Eliminates expensive fixtures. 8" wide belt works on entire areas at once. Quickest method on interrupted areas.



Model WG-4. For production runs on small parts, fed freehand or by simplest fixtures. Gives final finish to jobs done on automatics, band and hacksaws, lathes, milling machines, etc. Grinds carbide tipped tools.



#### PLATEN OR FREE BELT

Model B-6W. Quickly adaptable to flat, curved or irregular pieces. Various shaped platens form the flexible abrasive belt to fit many shapes of work. Free belt reaches inaccessible spots.



of Shapes

The C-6-a money maker in any shop—saves setup time-reworking of the shape-the continual loading of ordinary wheel with necessary abrasive material. For contour grinding-for flat-face grinding or polishing. A self-contained unit-guarded-equipped with dust drawer and outlet-26"x38". Mounting of con-

Jree! Let us prove that abrasive Belt Machining (wet or dry) can reduce rost of many operations. Send us samples

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ot many operations. Send us samples for recommendations—or ask to have our engineers discuss your problems at your convenience, at your plant.

PORTER-CABLE MACHINE CO. SYRACUSE 8, N.Y.

In Canada (except B.C.). Write Strongridge, Ltd., St. Cathorines, Ont.



ASK YOUR VICTOR

### the NEW molyflex High Speed Hand Hack Saw Blades

Your Victor distributor will tell you that this new "Molyflex"...when pitted against eight leading competitive blades in cutting treated SAE 52100 ball bearing steel... averaged 23.8% more metal cut than all the leading brands tested. He will tell you that this new "Molyflex"... an addition to the Victor line... has greater uniformity, is absolutely shatter-proof and unbreakable when used in a frame.

### VICTOR STEELRITE METAL MARKING CRAYONS

Ask your Victor distributor about the new Victor Steelrite Metal Marking Crayons. Available in a variety of sizes, these crayons are made of genuine soapstone. Special extrusion process insures uniform strength and composition. Markings can be made on hot, cold, damp or grimy metal and withstand pickling, yet do not affect enamel application.

Don't forget to ask for a free copy of the Victor Metal Cutting Booklet for your pocket or tool kit and the Victor Wall Chart for your shop. They'll bely you get the maximum efficiency from your metal cutting saw blades.



VICTOR

SAW WORKS, INC., Middletown, N. Y., U. S. A.

Makers of Hand and Power Hack Saw Blades.
Frames and Band Saw Blades

washed from the cutting heads into the drain trough by the deluge of the coolant used. Fig. 2 shows a typical cutting operation which is performed in the department, and Fig. 3 shows a section of the grill covered drain trough which



Fig. 3—The drain trough, which runs the entire length of the department, is covered by an iron grill.

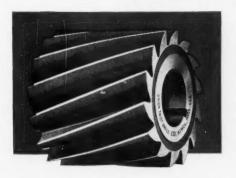
runs the full length of the department.

The chips are lifted from the drain trough by elevators, and they are deposited on mechanical conveyors which, in turn, carry them outside the building and into a hopper having double outlet spouts. Trucks are loaded from this hopper, and they carry the chips to the salvage department for further disposal.

The coolant from the drain trough is maintained in constant circulation by means of a pump and gravity flow system.

(All photos courtesy of El Segundo plant of Douglas Aircraft Co.)

# You get minimum downtime, maximum work from UNION milling cutters



UNDERCUT TEETH with a special spiral angle give unusual efficiency to Union plain milling cutters. These teeth afford maximum strength, ample chip clearance in the fillet and permit resharpening without rapid increase in the width of land. TWO BIS BENEFITS you can count on when you use Union Milling Cutters: less time lost, more work done.

These performance-proved cutting tools tackle the toughest jobs in the shop... day in, day out... with a minimum down-time for reconditioning. They cut costs as well as metal. Union cutters work to closest tolerances... get outstanding results from older machines as well as the latest equipment.

If you are not already using Union tools, see your nearby Union distributor. He will be glad to work with you on any milling problem. You'll find his name in THOMAS' REGISTER on Union's insert in the "Drills, Twist" section.

#### A CUTTER FOR EVERY JOB

Whether you need special cutters built to your specifications or can use the standard Union cutters, there's a Union milling cutter to meet your needs. Following is a partial list —

Plain Milling Cutters Helical Milling Cutters Metal Slitting Saws Scraw Sletting Cutters Slitting Shears Sido Milling Cutters

Keyseat Cutters End Mills Concave Cutters Convex Cutters Inserted Blade Cutters Form Cutters

no other milling cutter will outperform

MOINU

contact your local distributor

His name is listed in Union's THOMAS "AND STER insert under the heading, "Drills, Twist".

UNION TWIST DRILL COMPANY, ATHOL, MASSACHUSETTS



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## Sales Hints for the Smaller Shop

Karl F. Kirchhofer

### A discussion of a combination plan for obtaining business orders.

By KARL F. KIRCHHOFER

SALES plans and ideas come and go. Some are worthwhile and prove to be profitable, create business, make money for the company. Others are best forgotten.

In this article, the writer discusses a plan that has worked well for twenty years or more in widely diversified lines of business and industry from the sale of business paper subscriptions to the sale of machine tools to metal-working companies. I call this a combination plan since it is a combination of direct mail, telephone selling, space advertising, and personal contact. The best way to illustrate its workings is to cite an actual case history which proves that the combination plan can and does work.

The area selected for testing the plan was New England with its multitude of metal-working plants. The products to be sold to these plants comprised a line of inspection and measuring instruments. A trade paper advertising campaign had produced several dozen inquiries from executives who wanted more information regarding the measuring tools advertised. Although these inquiries were of value we still felt that we needed names of people who would actually invite us to visit them

and who would have a real need for measuring instruments. At that time, I was sales manager of a firm engaged in the manufacture and distribution of tools, gages and instruments of all kinds.

We prepared a double-page mailing piece: the first page was allotted to a message, in letter form. The inside pages comprised a spread with several illustrations showing our instruments and measuring tools at work. The letter on the first page was simple and direct, with a few lines referring to the inside pages and also to the back page which showed a typical inspection department. For days we scanned and checked the Directory of New England Manufacturers, and emerged with about 2,000 names of manufacturers whom we felt could use our products. The letter sent to these manufacturers read in part as follows: "At the invitation of several New England manufacturers, our representative will be in the vicinity of your plant soon to demonstrate our line of measuring instruments, tools and gages."

The letter pointed out the advantages of using inspection and measuring instruments and told how other plants had cut down rejections; saved



Six versatile De-Sta-Co Toggle Clamps save in this simple, economical, plastics cementing fixture. The turntable more than doubles production . . . eliminates the cementing cycle "bottleneck."

These perfect reproductions are for a manufacturer of metal kitchens. This operation, cementing on tops, requires: Fast cementing cycle—positive clamping pressure for a perfect bond—precise alignment for accurate assembly.

De-Sta-Co No. 225-U fills these requirements. Completely retractable when opened for quick insertion and removal of work, it offers the rapid toggle action, positive holding pressure and accurate performance that make De-Sta-Co Toggle Clamps *ideal* "Model Tooling".

For your working-holding problems in Assembly, Welding, Bonding, Machining, Inspection . . . of any materials . . . tool up with these economical, efficient, high-production examples of "Model Tooling".

De-Sta-Co Toggle Clamp Catalog describes more than forty stationary and portable clamps. Write for your free copy today.

### DETROIT STAMPING CO.

349 Midland Ave. • •

Detroit 3, Mich.

time and money by employing these tools. This direct mail effort brought about thirty requests to call at various New England plants. Return cards had been inserted with the double-page mailing piece, and when thirty New England executives returned them with the express wish to have a demonstration, it looked good; in fact, it was good. Out of the thirty requests for demonstrations, fifteen were sold on the first effort. That was the begin-

ning of the "combination plan that works."

The small shop with a product, or a specialty, like a new type vise or a newly developed measuring tool, can employ this combination plan with profit. First, there is trade paper advertising and publicity. These will produce a certain number of inquiries. Then, there is direct mail, often addressed to the list that receives the trade journal. Following that, there is

the telephone and here is how that works.

Let's say you have developed five inquiries in Hartford, Conn., for your new tool or device. You assort these inquiries geographically. Then, consulting the classified telephone directory, you select names in the line of business you wish to reach. such as metalworking, tools and dies, and stampings. Then, upon arrival in Hartford, you pick up the telephone and say in effect, "At the invitation of a number of Hartford plants I am here to demonstrate a new type vise. It happens that I have an appointment with the Jones Instrument Company which is down the

# J&L STEEL FREE-CUTTING STEEL

- ★ New Bessemer Screw Stock with Proved Machinability Ratings as High as 170!
- \* Backed by 50 years of leadership in the field of free-machining, cold-finished steels.
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### Machine-shop operators report:

- Better machine finish
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"E" Steel is quality-controlled from our own mines through the finished product.

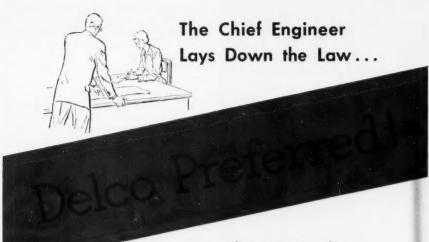


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May, 1950

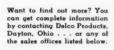
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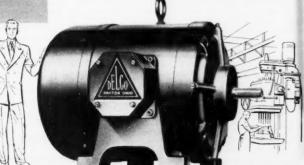


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Get the Motor that Keeps Machines Rolling

It's on more and more spec sheets—those two important words, "DELCO PRE-FERRED." Because here's a motor built the way production men want motors built: sturdy, rugged, dependable. Just take a look at the performance extras that Delco Motors give you to eliminate machine down-time, cut down motor maintenance.



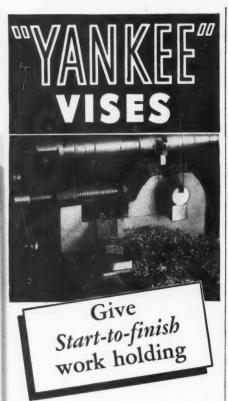




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Take a job through every step without a misstep . . . faster, easier . . . in a "Yankee" Vise. Work lined up accurately from bench to drill press, to milling machine and back to bench. Lifts off and on a swivel base at the bench. Vise squared on top, bottom, sides and front end for machine work. Easily made into handy, economical jig. Hardened steel block, V-grooved, provided with each "Yankee" Vise. Four sizes, with and without swivel base ... 11/2", 2", 23/4" and 4" jaw widths. Your industrial distributor carries the full line. Write today for the "Yankee" Tool Book . . . handy tips about these and other "Yankee" time-saver tools.

"YANKEE" TOOLS NOW PART OF

STANLEY THE TOOL BOX OF THE WORLD

NORTH BROS. MFG. CO. Philadelphia 33, Pa.

plant. Since I will be in your neighborhood, I'd very much like to call to show you the advantages of the new vise, how it will save you time in performing your work and other features that make it an excellent investment for your plant."

If the prospect agrees to see you, you've an excellent chance of selling him once you call there in person. If he refuses to see you, then don't waste any more time on that particular visit attempting to reach him. Instead, go over the names on your list until you've lined up perhaps ten or twenty other individuals who agree to see you. If you will select these on a geographical basis, that is, endeavor to get appointments in the neighborhoods where people have already asked to see you, you'll be amazed at the increase in profitable calls that you can make.

The windup of the combination plan, which has included your trade journal advertising, publicity, direct mail and telephone calls, is the personal call where you actually show and demonstrate the product. Remember, that all the foregoing has been preparatory work up to the time when you or your salesmen can engage the prospect in face to face discussion. This subject. the sales interview, is big enough to warrant a full column, big enough in fact to fill a book. In a future column, we shall endeavor to point out methods of personal selling which the writer has observed and developed in selling trips from Maine to Texas.

For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.

# Beat Costly Obsolescence

with Shapers MATCHED FOR THE JOB

MODERNIZE

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PRECISION SHAPERS

### .. to CUT PRODUCTION COSTS and INCREASE PROFITS

GEMCO Shapers provide a 3-way efficiency...ruggedness, precision, adaptability. In 3 models... for average machine shop work (PLAIN); for heavy production work (PRODUCTION); for tool and die work, etc. (UNIVERSAL). IN SIZES FROM 16" TO 36" INCL.

In these New Model Universal Shapers, GEMCO engineers have incorporated new, additional features...

- Built-in horizontal and vertical Power Rapid Traverse.
- Built-in horizontal and vertical Selective Feed.
- 3. All controls unilaterally located for Ease in Operation.
- Twin Bull-Gear Drive for longer operating life.
- Superior design enabling quick, easy Servicing when necessary.

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WRITE FOR BULLETIN GC-135

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# Faster Carbide Grinding... when you Follow the Norton way

CRYSTOLON WHEELS
(Green and Gray) in the new K Bond
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In Vitrified, Resinoid and Metal Bonds
in Vitrified, Resinoid and Metal Bonds



Making better products to make other products better

# Better Carbide Grinding

### The New K Bond CRYSTOLON WHEELS

Faster and freer cutting action, more uniform grinding action—that's what you get with the new Norton K bond. In plant after plant they are reporting lower and lower grinding costs with this new CRYSTOLON wheel.

### Vitrified Bond DIAMOND WHEELS

Outstanding for the grinding of single-point tools is the Norton vitrified bonded diamond wheel. Its unique structure gives it a combination of cutting ability and durability far beyond that of any other diamond wheel. Vitrified wheels are also popular in many plants for chip breaker grinding.

### Resinoid and Metal Bond DIAMOND WHEELS

For the precision grinding of multi-tooth cutters Norton resincid bond diamond wheels are the outstanding choice. They are also the first choice for many chip breaker grinding jobs. For cut-off jobs and for some single-point jobs there are Norton metal bond diamond wheels.

### NORTON HAS COMPLETE CARBIDE GRINDING SERVICE

1. Product variety to properly handle every carbide grinding job; 2. expert engineering help the country over; 3. two helpful motion picture films; 4. a 138-page handbook on carbide grinding which will be sent on request—ask

NORTON

for Form 167-A.

NORTON COMPANY WORCESTER & MASS - Warehouses in Five (



Grinding single-point tool with new K bond CRYSTOLON wheel.



Grinding single-point tool with vitrified bond diamond wheel.



Grinding chip breaker with Norton vitrified band diamond wheel.



Grinding multi-tooth cutter with a Norton resinoid diamond wheel.

W-1294

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Model 55 IMPROVED VERTICAL MILL. A speed range of 80 to 2700 RPM's combines with a 1 H.P drive, 31/4" quill, and extra rugged spindle mounted on over-size precision ball bearings to give a capacity of 1/6" to 11/6" end mills in steel. Spindle quill travel is 51/4" either by lever, hand wheel, or power, and has adjustable positive stop and automatic safety throw-out. Table 40" x 9" or larger. Longitudinal table power feed has 8 geared feed changes.

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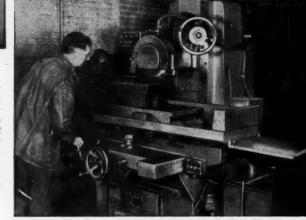
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# Getting Set For Pensions --- Your Problems and Policy

By WILLIAM J. CASEY

Chairman, Editorial Board, The Research Institute of America, Inc.

THE year 1949 marked the first round in the fight for pensions and for all practical purposes, the unions won it. 1950 is certain to witness the second round. Any company which hasn't run smack into the widespread drive for retirement benefits should anticipate it this year. No company can hold itself aloof because it considers itself too small, or because it cannot afford pensions, or because its workforce is not unionized.

In nonunionized companies many personnel and competitive factors will increasingly require management to face the pension issue squarely. Other employers will find themselves confronted with the issue in other ways. In Toledo, for example, the United Automobile Workers (CIO) are pushing their proposal for "area pensions." In that city, UAW is driving hard, as the representative of workers in over 125 companies, to set up retirement benefits on an area-wide basis.

Though there exists considerable doubt and confusion over the meaning and the cost of pension agreements negotiated last year in the basic industries such as steel and auto, organized labor's drive for pensions must be accepted as an acknowledged success, at

least to the extent that management's responsibility—in whole or in part—for the economic security of workers in old age has been nailed down.

Pressure for pensions will be felt by all companies, unionized or not, in all industries and in all sections of the country. Intensified and expanded pressure will manifest itself in at least two directions: (1) to force pension plans on more companies; and (2) to compel companies with pension plans to increase benefits. For companies that haven't as yet faced the pension problem there are a good many lessons to be learned from the experiences of the past six or eight months. Many of the publicized pension settlements reveal the difficulties that exist in negotiating or establishing pension programs under pressure.

Pension prices cannot be compared with automobile, clothing, or shoe prices. The tag on a manufactured article represents the sum of production charges already incurred, plus the manufacturers' hoped-for override. But when you're setting up the cost of a pension plan, you're trying to guess what you're going to spend ten, thirty, possibly even fifty years from now. You have to make a forecast on a great



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many things: (1) death rate of your employees, before and after retirement; (2) probable interest yield on sound investments for the next fifty years; (3) probable rise in wage levels in years to come, and the whole problem of inflation; (4) long-term earning prospects in your business; (5) your probable record in number of employees to be hired, average age, quit rate, and even whether you will be taking on more men or women.

This sounds like almost buying a pig

in a poke. But all these items have to be taken into account unless you like to spend money with your eyes blindfolded.

### Approaching the Problem

Because of these seeming imponderables, it's wise management policy to become familiar with the many questions involved—even where a company feels that a pension issue doesn't exist for it, or is extremely remote. No company can intelligently decide for or

against a pension program unless it has first explored the pros and cons of the many possibilities. The toughest, yet the fundamental, determination whether a company can undertake a pension plan at all, and what kind of a commitment it is prepared to make if any.

Such perplexing questions as these must be answered: Should a company commit itself to pay a definite pension or merely to make a specific contribution to a fund? Should the amount of the pension depend on what the fund will pay, with a liability limited to the fund and not attached to the company? What kind of benefits?



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### What Will It Cost?

This is the question most businessmen ask first about pensions. It can only be answered by thorough study of such factors as the nature and size of benefits, who qualifies under the plan, what the turnover is likely to be, industry mortality experience, cost position of the specific company and investment yield forecasts. Even with such information, an estimate is all that is possible. The talk about the cost of recent collective bargaining negotiations has been overly optimistic according to a good many impartial experts. Many actuaries feel that the eventual cost of any of the agreements (particularly in steel) will take twice the funds currently being put aside. The amount actually paid out in retirement benefits will depend on many unknowns, firstly, how long the covered employees will live. Normally, pension benefits will vary with length of service and compensation, However, the cost estimate can be quite definite and reliable where pensions are funded by insurance or where the workforce is large enough to make a reasonably conservative actuarial appraisal.

There are two separate elements to consider: (1) the cost of providing benefits earned by service performed after installation of the pension plan; and (2) the cost of the benefits for service before the plan starts. This gross cost will loom large—especially as an annual charge—if employees tend to be old, and higher still if many people have worked for the company a long time. In such cases, it is often necessary to reduce benefits for past service.

### Reducing Cost

The most dramatic reduction in cost can be achieved by raising the retirement age or reducing the scale of benefits. Once those factors are settled on, the following possibilities may be explored:

1. Contributions by employees. These

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are required in many of the current pension systems. Despite union demands for the employer to contribute all, many pension authorities believe that employees can be persuaded to contribute to a program designed so that it's saleable as an investment to employees. In this connection, let's not overlook the fact that in Inland Steel, where the employees had a choice, a substantial majority enrolled in the plan which required them to contribute.

2. Restricting eligibility. Some companies cover only employees who have reached a certain age (generally 25 or 30) and who have more than five years of service. Then again you have some plans that are restricted to office employees or those who are paid salaries, or going still further those making say \$3,000 or more.

3. Taxes. An employer's contribution to a pension plan is deducted from federal income tax, if approved by the Bureau of Internal Revenue.

> This is as good a place as any to point out that the unions have developed some artarguments against employee contribution. It's one that you're bound to run into. They claim that a qualified employer who is making a profit pays 62 per cent of the cost of pensions; the government. 38 per cent. What they overlook-in fact management is guilty of the same oversightis that this of course can be said of the payroll cost as well. In any case there's always the question of how many dollars, even the 62 cent kind, a company can afford to convert from profit to a cost item.

> 4. Turnover. Over a period of vears, a fund





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builds up from quits, lavoffs. mortality, and employees who leave without having acquired any vested right in the contributions made on their behalf. This is either discounted or money becomes available to fund pensions for other employees.

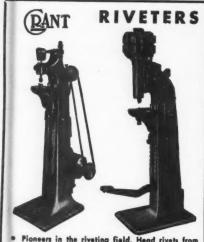
5. Cost of superannuation. In one way or another, many companies carry employees who have lost steam. Some firms even go further and pay out funds on an informal basis to help retired employees. Where a pension plan

makes it possible to eliminate these costs, the saving can be charged against the gross cost of pensions.

### **How Much Pension?**

In deciding on a scale of pension benefits, there are two main factors: (1) adequate retirement income for employees, and (2) what the company can afford. A pension, plus social security and any other income, should permit an employee to maintain a retirement standard of living somewhat commensurate with his working income and grade of employment. Obviously, this amount will vary by industry, locality and type of personnel. In any event, a pension should be high enough so that no backwash of personnel problems is created when an employee leaves a company.

Admittedly, this is a highly salutory goal. Yet, at the same time, benefits must be geared to a conservative appraisal of the company's long-term economic prospects. It's not very sound to enter into a pension program with the mental reservation that the plan can be ended or the scale of benefits reduced come economic uncertainty or actual business let-down. Such steps may involve complications which will do more harm than the good achieved by starting the program in the first place. Therefore, it is good judgement to gear any scale of benefits to an annual charge which seems well within the company's long-term capacity to carry.



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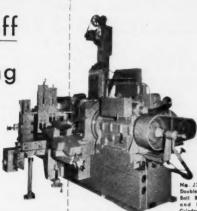
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Generally speaking, benefits are likely to be adequate if, including social security, they range from 30 to 50 per cent of the compensation received for full-time work before retirement. If a pension plan isn't able to pay as much as \$50 a month in current benefits at age 65 (not including social security) to lower rated employees with average length of service, it's probably desirable to consider raising the retirement age. \$50 a month at 68 probably makes more sense than an inadequate amount at age 65.

## **Setting Benefits**

The pension might very well reflect two things: the earnings of the employee and his contribution to the company; that is, the length of his service and its value. To achieve this, a scale of benefits is determined in one of the following ways:

1. The employer (and employee, if the plan is contributory) contributes a stated percentage of pay each year. The pension then will be whatever amount the funds so accumulated will purchase at retirement.

2. During each year of service a participant earns an annual retirement benefit of 1 per cent or more of his average or final earnings.

3. If an employee completes a stipulated period of service, his pension would be a specified percentage of his average or final pay.

4. Set a flat amount for each year of service regardless of salary, provided a minimum service period is completed.

### Social Security

Where the amount of a pension is set either in terms of service or earnings, or by a flat amount, it may be integrated with social security benefits. Some companies provide that these benefits are to be deducted from the retirement amount used to fix the pension to be provided by the company's plan. For example, last year



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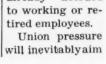
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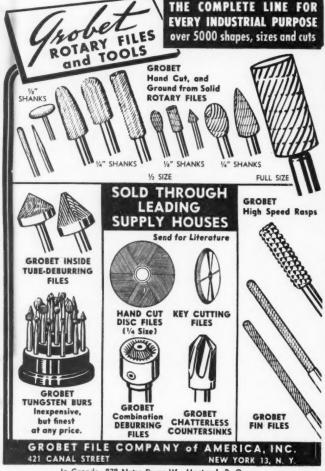
both the Ford Motor Company and the Inland Steel Company non-contributory plans allowed for full deduction of primary social security benefits. However, the Inland Steel optional plan, which is on a contributory basis and offered as an alternative to employes who want it, does not allow for reductions for social security. Where a plan promises only the pension benefits that can be bought by the accumulated funds, the agreement can specify

that company contributions will be decreased as social security benefits or taxes are increased.

Pensions that are still in the planning stage might very well be held up, where that's possible, until the legislative picture on proposed Congressional social security commitments is clear. Where pressure, either from unions or employees, makes it impossible to postpone, some arrangement for later adjustment should be made. This may be

accomplished under a formula that guaranteesa benefit minus social security. like the non-contributory Inland Steel plan, rather than plus social security, like the Inland Steel's optional contributory plan. Under the minus methadjustments od. can apply all around, including the pensions currently paid workers already retired. On the other hand, a plus formula forecloses the advantages of an increase in social security benefits without obvious reduction of promises or commitments. Moreover, this reduction cannot apply to benefits already accrued to working or retired employees.





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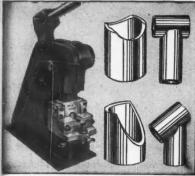
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at applying these cost savings to increase benefits. If this happens, the company should be in a position to show, if it wants to, that the net retirement benefit is adequate in terms of employee need and commitments of other companies, and that funds released from company pension commitments by social security changes will be used in maintaining the company's competitive position and improving productivity. That's another way of saying greater job and wage security.

**Eligibility Factors** 

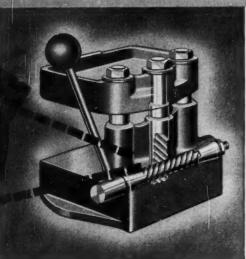
Whether a set of requirements for a particular company is right or not depends on the objectives of its pension plan and the costs it is prepared to carry. In setting entrance requirements, two inconsistent considerations must be recognized. On the one hand, the burden of administration and paper work make it desirable to limit participation to employees who are likely to remain on the company's payroll until retirement. The cost of paper work obviously runs up where the turnover is likely to be great because younger and newly employed people are included. If the plan is insured, this takes a large toll in surrender charges. For this reason, the age and service requirements for female employees, for example, may be set higher than for male.

On the other hand, one of the important purposes of the pension plan is to effect a reduction in turnover. To accomplish this, eligibility requirements must be such that within a relatively short time, an employee will begin to feel that he is sacrificing valuable pension rights if he moves on to another job.

Here are some eligibility factors which may be used in constructing the pension plan: (1) attainment of a minimum age (25 or 30, or 25 for men and 30 for women); (2) completion of a specified length of service (one to five years); (3) a combination of age and

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length of service requirements under which the length of service requirement for participation is reduced as the age of an employee is increased. For example, employees under 30 may be ineligible until they complete five years of service; employees between 30 and 40 years of age may be ineligible until they have four years of service; employees 40 to 45 years of age may be eligible after three years of service; and so on. (4) Some plans set a maxi-

mum age yet employees over the maximum age are generally those to whom a pension is most important, and it's usually bad personnel policy to exclude them. But in specific situations, the inclusion of a large number of employees near retirement age will make it impossible for a company to carry a pension plan at all. Such cost pressure may be best handled by reducing the amount of benefits earned by past service, thus reducing the scale of pension

benefits for employees who reach retirement age before the company has had an opportunity build up an adequate fund. (5) Participation may be restricted to office employees or those paid on a basis weekly rather than an hourly or commission rate. (6) Emplovees earning less than a minimum annual income, such as casual or temporary workers, may be excluded. Or to approach it in another way. determining whether employees have earned enough to qualify, commissions. bonuses, and so on, may be excluded.

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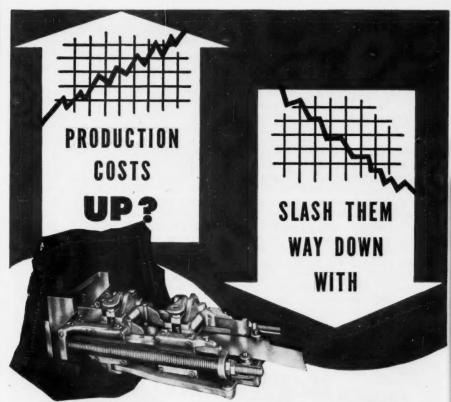
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company experience that can serve as a guide. For instance, draw up a list of withdrawals over the past several years, by length of service and by age. Check the pattern to see where the bulk of withdrawals exists—from an age as well as service standpoint. Then you're in a position to set a realistic cut-off that eliminates big turnover.

## Retirement Age

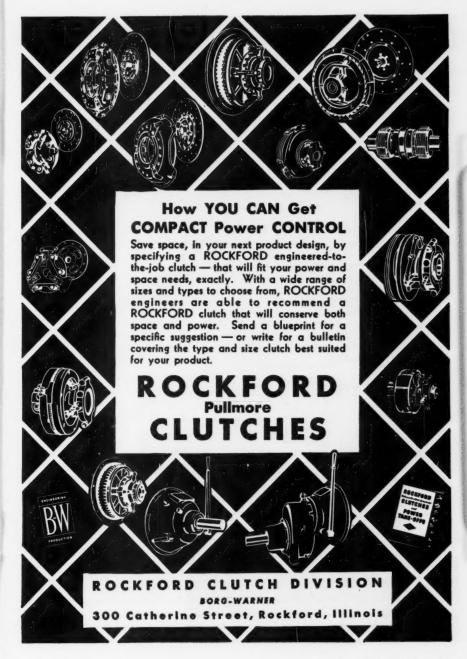
There's been a common tendency to set age 65 as the retirement point. This is probably influenced by the fact that social security payments begin then. But a higher age can be set, and usually is for the purpose of reducing costs. Nor is an earlier age impossible. But the hazardous character of work or special unsuitability of employees of advanced age is the reason which is usually behind the earlier age. Another factor to consider in determining when to retire older employees is the morale and promotion opportunities of younger employees, as well as the probable ef-

fectiveness of older employees.

It may be reasonably assumed that once unions have driven home the pattern of negotiated pensions as a program of industrial policy that they will look for a host of improvements not only in increased pension payments but in retirement at earlier ages. These aims, motivated by self interest, must eventually conflict with paramount national problems. For example, in 1920 there were five million people in the United States over 65, today there are eleven million, and thirty years from now there will probably be twenty million. From these figures, it is apparent that more people will have to continue to be productive if living standards are to remain satisfactory.

Many pension plans use, and many new ones will be using, age 65 as the working terminal point. It may be wiser in many situations to leave retirement age up to the worker, particularly if his capacity is up to par. It may be advisable to consider a discre-





tionary retirement age, plus provisions that will give some degree of flexibility. For example: (1) At an employee's request he may retire at an earlier age (usually within a few years of normal retirement). Retirement upon request should be conditioned upon employer consent. Upon such early retirement, benefits may be restricted to the value of pension credits earned to the date of retirement. (2) On the other hand the employer may ask the employee to continue work as

long as he is willing. (One incentive for continued service is the earning of additional pension credits.)

### **Death Benefits**

In the consideration of a pension program—or for that matter any employee welfare program—employers should bear in mind that death benefits are a more common need than retirement benefits. The problem is apt to hit any company. Death benefits come closer to meeting the immediate

needs of most employees. More important, the cost of providing these benefits, as a separate item, is far less than retirement.

Death benefits, when combined with a retirement program, pose a two-fold problem: (1) How much of a death benefit should be paid before retirement? (2) What is a desirable amount after a worker has retired?

Each need is different. In the first situation the amount should be large enough to cover the final expense, usually in the neighborhood of a thousand dollars. Such high coverage is seldom continued after retirement. The cost becomes much greater and the basic reasons for generous cov-





erage decline along with family responsibilities. Consequently, death benefits after retirement are seldom much more than is enough for final medical and burial expenses.

## Disability Pensions

Employers should anticipate that, as part of the pension package, unions are demanding disability benefits for employees who become permanently disabled. The United Steelworkers (CIO), for example, demanded a monthly dis-

ability pension of \$150 for employees with service of ten years or more. The final agreement provided a third of the demand.

Disability is one of those imponderables that cannot be predicted accurately. Insurance companies are generally unwilling to cover permanent disability, although they cover disability from sickness or accident for limited periods of time. Among other things, the existence of a disability feature in the program tends to increase the incidence of disability, as both employees and, to some extent, management lose incentive to carry on and to discover useful areas of activity.

As an alternative to disability benefits it may be wise to investigate thoroughly the desirability of permitting an early retirement (discussed above) as a partial means of meeting the disability problem. The most economical way to handle permanent disability may be on a case-by-case basis, as follows: (1) The same program may be used for disability coverage as for the pension plan but it is desirable to create separate reserves and cost records. (2) Any declaration of policy that might ripen into a contractual obligation should be avoided, unless bargaining pressure demands written promises. (3) Minimum terms of age. length of service or both should be set before payment of disability benefits. (4) Each case should be checked thoroughly. An open, painstaking effort to verify claims may result in an





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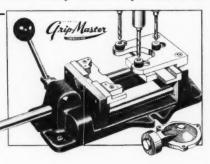
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NATIONAL MACHINE TOOL CO. Dept. 110-E, RACINE, WISCONSIN





May, 1950

MODERN MACHINE SHOP

197

atmosphere in which only employees with justifiable claims will seek full benefits.

## Financing Your Plan

The money to pay pensions will come from a fund built up by the annual contributions of employer or both employee and employer, or from the current operating revenue of the company. In recent negotiations, unions have emphasized pay-as-you-go plans in an effort to minimize cost, establish the principle of employer-pay-all and get the largest possible scale of benefits. The main objective is to get adequate pensions for those employees due to retire shortly. But the pay-as-yougo or unfunded plan merely gives the company a pension payroll in addition to its regular productive payroll. The company is relieved of making annual contributions while the employee works, but must pay him the pension amount after he stops working. Therefore, these plans can be deceptive and seem to represent less of a financial burden than funding an actuarially sound pension program.

Pay-as-you-go plans are doubly vulnerable in depression years. Reduced operations tend to increase the number of pensioners just when the business is least able to stand more nonproductive costs. This may mean ultimate discontinuance.

Funded plans are not only more durable and more flexible, but they can be much less expensive because they permit company contributions to be augmented by employee contributions, by interest and by tax savings unavailable in a pay-as-you-go plan.

A pension plan can be funded by depositing funds in trust under the administration of the company and/or trustees or by buying appropriate contracts from an insurance company. Funding through insurance contracts provides a spread of risks and gives de-



bend pipe by hand or power with

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cold pipe, conduit and heavy wall tube
BENDING MACHINES
Fast... Simple... Dependable...

## RADIANT HEAT BENDS in Standard Pipe

Fast . . . Accurate . . . Average bend takes only 60 seconds! Up to 180° bends . . . all sizes from ½" to 2". Usual radiant heat bends for 1½" at 6" and 9" radii can be supplied, Only 7 parts. Occupies 18" x 18" floor space.

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Air operated, electrically controlled Snow tools are establishing amazing production records daily on a wide variety of work. Just note these typical examples:

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Crossdrill and C"T" Sink 1/16" Hole

Material-Brass Production-4800 per hour Fixture-#15 Vertical index Equipment - #1-UD Drilling Machine



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Tap Two #10-32 Holes

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3/8"-24 Thread-1/2" Long

Material - Die Cast Aluminum Production-2500 per hour Fixture-#10 Drum dial Equipment - #3-TR Threading machine



Snow air operated—electrically controlled machines have built in full universal controls that allow selection of the type of spindle cycle desired. This feature also permits instant synchronization of the standard Snow Master Fixtures All types of air operated automatic and semi-automatic jigs and fixtures are carried in stock. Standardization permits low cost tooling—and—high production.
Sensitivity of power application pre-

vents tool breakage.

Simplicity of control means that set up and operation can be handled by a less experienced operator with minimum fatigue.

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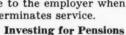
MANUFACTURING COMPANY 435 Eastern Ave., Bellwood, Illinois

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finite guarantees. Funding through a self-administered fund may allow greater flexibility in handling the cost burden from year to year.

Most pension plans for small companies of ordinary financial strength are operated by the purchase of a standard retirement annuity or retirement income policy for each employee. The definition of a small company varies. By rule of thumb, it would include firms with less than 100 employees. Although some companies won't write individual policies on over 60 employees, others stop at 200.

If the number of employees to be covered is 100 or more the insurance company contract most often used is a group annuity. The regular contract provides for the purchase of guaranteed paid-up deferred annuities. Annuities are purchased each year as a credit for the current year of service. Annuity credits for years before the inception of the pension plan are usually purchased by the employer over a period of years. After prior service credits are completely purchased there exists a fully funded plan under which all pension promises are supported by insurance company guarantees. Group annuity contracts aren't discounted for severance. If employer annuities are not vested in employees, a return is made to the employer when an employe terminates service.



Importance of the investment factor is too easily overlooked in the rush of setting up a pension program. It sometimes pays to do business the hard way. One tenth of a point better investment yield can mean enough cost reduction to offset a 21/2 per cent rise in current expenses. If raising the plan's administrative expenses just 5 or 8 per cent can boost the yield on investments from 21/2 to 3 per cent, there is real saving.

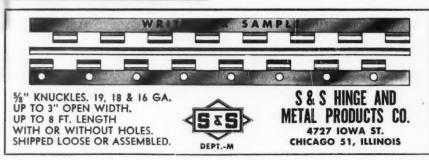
Even before you have formulated any definite investment program leave



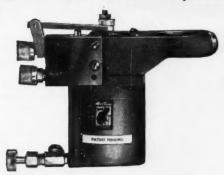
This new, streamlined bench type grinder assures fast, quality finishing on metals, plastics, wood, fibre . . . at low cost. Built to machine tool specifications, Standard D-4 is equipped with improved band tension control and specially designed protective motor hood. 4x36½" band. The ideal portable unit.

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## USE A NEW MEAD PNEUMATIC DRILL

This simple, inexpensive device quickly converts standard drill presses into semi-automatic machines — increases production substantially on suitable jobs: double or more in some cases.

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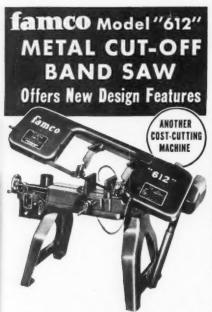
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• Truly a finished machine tool, the Famco "612" Metal Cut-Off Band Saw cuts all shapes, all types of metals. It's ruggedly built of semi-steel castings and alloy steel. Cast aluminum guards provide extra safety. Capacities up to 6" round and 6" x 12" rectangular stock. Made in the typical Famco tradition of "the highest quality machine for the money."

## A Few Famous Famco Features

Open construction for easy access; microset stock stop for quick setting, precision sawing; \( \frac{\pi\_n}{k} \) x .032 blade; coolant system added in a jiffy; improved design means easier blade changes; Timken roller bearing equipped transmission; quick setting guide arms; blade guard telescopes automatically; 50, 100, 175 and 300 FPM cutting speeds; vise jaws adjust to 45° angle.



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yourself free, right from the start. The investment of trust funds in most states has to follow very rigid rules unless the trust agreement itself provides differently. Otherwise, you have to stay within an "approved list" and forego possible chances for a better yield in many propositions where the safety margin may be just as great. Avoid this by specific language that empowers the trustees to invest wholly at their own best discretion and in any desirable investment, including common stocks.

Advisability of putting a portion of the pension reserve in a company's stock can't be generalized—it depends principally upon the degree of risk together with these considerations: (1) Crucial blocks of the company's securities in the funds' hands could perpetuate an inefficient management. (2) On the other hand, if through stock ownership the fund depends for some of its earnings upon profits, the pension system can become a significant part of a firm's production incentive program.

Before getting approval to invest in stock or securities issued by the employer, the trustee of a qualified plan must give the Treasury a detailed analysis of the employer's financial record for the past 5 years and the extent of self-investment contemplated.

## **Spreading Investments**

In present-day markets, practical operating conditions impose restrictions just as severe as the legal ones, particularly on small or self-administered pension plans. A diversified security portfolio can become a non-paying proposition when "in-and-out" expenses (taxes, commissions, and so on) represent the equivalent of a year's income, making easy adjustment to changing security market conditions very difficult. Some of the smaller funds feel that the management and expense overhead is not worth possible higher return and solve the problem

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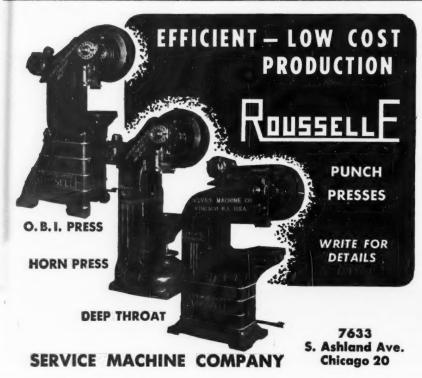
SANFORD MANUFACTURING CO. 1021 COMMERCE AVENUE UNION, NEW JERSEY by relying almost entirely on Series F Treasury bonds. These yield  $2\frac{1}{2}$  per cent, but only \$100,000 can be purchased for one account per year.

Another solution receiving more and more attention is mutual funds, which provide a simple means of diversifying investments and offer a very flexible risk selection. Mutual funds are offered in almost any proportion of risk, from the highest grade with a low yield to highly speculative funds with more generous return as the margin of safety goes down. These mutual funds usually assure untrained investors a high degree of experienced supervision which, on an individual basis, would be comparatively costly.

Large self-administered plans can normally afford the administrative cost of personalized continuous investment management that makes it feasible to maintain a direct investment program. By modifying investment standards, and proportionately increasing the risk of capital impairment, it has been possible to get an investment yield of as much as 4 per cent, even today. The (up to now) successful experience of college funds may turn more and more pension financing in this direction.

### **Insurance Contracts**

Plans which employ insurance contracts as their funding media are relieved of practically all investment problems automatically. For investment purposes, insurance companies merge pension receipts with general assets. Unless a particular plan has had to counterbalance an unfavorable





That's right . . . today wherever electric motors for land, air or sea power are made, you'll find CIRCLE R saws at work!

These CIRCLE R Saws are clearance ground to prevent binding.

"U" and "V" Type High Speed Steel or Solid Tungsten Carbide



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loss, it will participate equally in the net earnings. As investment vehicles, insurance companies have exhibited a steady degree of favorable return. Net earnings rates for the past few years have been just under 3 per cent. Insurance companies are often able to effect considerable administrative investment economies, notably through large scale direct loans—50 to 100 million dollars—which in other years have been handled through public bond issues.

Direct placement often means very high underwriting and marketing savings. In addition, many of the insurance companies have an above-average yield from real estate mortgages, an investment that is usually not feasible for direct handling by the average private investor.

## **Negotiating Pointers**

A sound pension plan is an intricate and delicate social mechanism. The



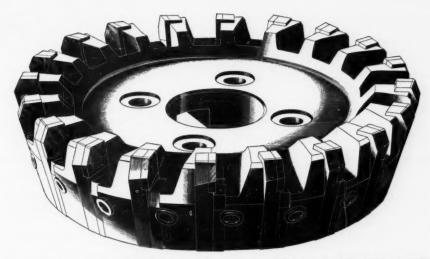
horse trading atmosphere of collective bargaining is not conducive to the careful study of pension planning which is essential. Note how recent pension bargaining became snarled up in "cents per hour" concepts. This is quicksand. Ten cents an hour will buy entirely different benefits for different companies, depending on age composition of the payroll, length of service and such varying factors. When bargaining contains a promise of stipulated rate of benefits, yet sets a deal in cents per hour, the only thing which is certain is ultimate dissatisfaction and future trouble.

### Conclusion

If you must bargain on pensions, don't buy patterns. Study your own facts and work out your own policy on these points:

(1) Do your employees need or want a pension program? (2) What can you afford? (3) What kind of union pressure will you face? (4) In light of union attitude and company realities, formulate a definite position, (5) Try to avoid any definite commitments before security picture is settled. (6) Don't place too much reliance on a clause that pensions will not be reopened, say, for five years. (7) Keep away from cents-per-hour talk. (8) Weigh the cost of extras and the cost of vesting ownership of funds in employees very carefully against the savings that may come from employee contributions. (9) Keep some control over who should retire and when.

For further information on any product mentioned in this issue—use the READER SERVICE CARD between the covers.



The New GAIRING

## E-CON-O-MILL

PATENT APPLIED FOR

The new Gairing E-Con-O-Mill, Series 6500, 10-inch diameter, with twenty blades.

Series 6500

with a greater number of blades

TWO years ago we introduced the original E-Con-O-MILL, the conetype face mill, that saves on grinding costs, cuts down tool inventory, and reduces machine down-time.

Now we present this new E-Con-O-MILL, with all the economy features of the original, *plus* a greater number of blades.

Cutter bodies are of the cone type, and are made in diameters of 8, 10, 12, and 14 inches. They support the blades full length in accurately machined slots.

Blades of ½ by % tool bit type are tapered two ways, and tungsten carbide tipped. They come finish ground,

and may be sharpened individually with the aid of the same combination grinding fixture and checking gage used for the original E-Con-O-MILLS. They are quickly inserted without removing the cutter from the machine. The same blades serve all sizes of Series 6500 cutters.

Available in three types: to cut steel, cast iron, and non-ferrous materials, each type with the proper carbide, and the tips ground to the correct radial and axial rakes.

Locks (the same as used in the original E-Con-O-MILL) are assembled in one piece, and remain attached when blades are removed.

The GAIRING TOOL COMPANY, Box 478, Detroit 32, Mich.



## Highlights of Papers Presented at ASTE Technical Sessions

SQUEEZING solid blocks of hard steel into many different hollow shapes—just like forming a toothpaste tube from a piece of soft lead—is a new



J. Parker Bowden

accomplishment of industry which may cut manufacturing costs and save large amounts of valuable metals in the event of another war, according to J. P. Bowden of Heintz Manufacturing Company, Philadelphia.

The idea of "cold forming" steel originated in Germany during the war, Bowden said. The Heintz Company however, according to Bowden, has carried the process up to a point where we have now outdistanced German researchers in its application in production to all kinds of products. Working with Government ordnance officers, the company has successfully produced many war material items including 20 mm. and 75 mm. shell bodies, rocket motor bodies, burster casings and 105 mm. howitzer cartridge cases.

The new process is said to improve the quality of the finished product, frequently eliminating need for expensive alloy steels and critical brass and bronze. It replaces forging and casting and reduces machining operations required. Enormous savings in scrap are also possible.

On 105 mm. cartridge cases, he said, "... two cases may be made out of the same quantity of steel as formerly required for one—and the steel itself may be of lower cost type."

Secret of the process is discovery of a method of lubricating the steel during the cold forming process. Some steels, he pointed out, could be reduced to less than one-sixth their original cross-sectional area while pushing them through dies. They also became almost three times stronger in the process and finish is better than by machining, he added. In some of the Heintz Company experimental work, forces up to 325 tons were required to form the blocks of steel.

## Ultra-Hard New Die Metal Cutting Costs of Metal Products

ULTRA-HARD cemented tungsten carbide offers industry an excellent means not only of reducing the cost of all kinds of formed, punched or drawn metal stampings but also to improve the quality of such products, according to George Eglinton, Vice-President, Lincoln Park Industries, Inc., Lincoln Park, Michigan.

Mr. Eglinton said that dies made of this material cost only 2 to 4 times as much as steel dies but last 10 to 50 times as long and produce better products while they are being used.

In addition to the reduced die cost, Eglinton pointed out, the freedom from



G. F. Eglinton

service trouble means higher production from stamping presses with less down time for maintenance.

Users of such dies were warned, however, to watch their press equipment. Since the carbide die continues to turn out

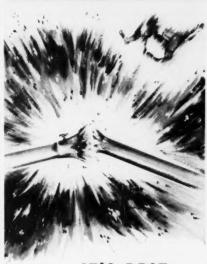
high quality stampings long after the press would have had to be shut down with a steel die, there is a tendency to forget that press mechanisms require attention, he pointed out.

New Manufacturing Development to Cut Cost in Tooling Up New Aircraft

MAJOR efforts are being made in the aircraft industry to reduce the cost of tooling to produce new types of planes. As an example, R. B. Schulze, General Supervisor of Manufacturing Research, Glenn L. Martin Company, Baltimore, Maryland, revealed details of a new development in making dies which is claimed to cut die cost just about in half.

The process is said to combine the high production capacity and accurate forming ability of conventional steel dies with the low cost of easily and quickly fabricated dies made of rubber.

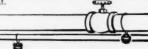
Use of rubber in die construction first came into use a number of years ago to provide quick low-cost tooling for short runs. The process, Mr. Schulze said, did not lend itself as well to the higher production levels now



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Matthews' embossed SAFETY TAGS, installed on every exposed pipeline, and on every valve or junction, minimize the danger of costly mistakes. SAFETY TAGS are produced from brilliantly colored metal, conforming to recommended safety color codes. They're inexpensive . . . they're permanent.



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NEWARK BUSION PHILADELPHIA CHICAGO NEWARK STRACUS! CLEVELAND CINCINNATI DALLAS BIRMINGHAM LOS ANGELES reached at times in the aircraft industry. It also did not work out too well when the metal had to be "stretched" in forming it, as so often is required.



R. B. Schulze

The new halfsteel half-rubber die construction is said to overcome these difficulties. Time required to set up machines for use of these dies is claimed to be negligible. In many cases the new dies are said to be providing

better ability to "stretch" metals to desired shape than steel dies. The rubber apparently provides a cushion which enables metal to be drawn some 50 per cent deeper than with steel dies.

An important advantage of this development is that it may eliminate multiple operations in forming of metal parts, it is said. From a safety standpoint the dies are also claimed to enable drawing of metals to more uniform thickness. The dies have already been used for a number of different materials including sheet steel up to 1/10 inch thick and aluminum up to % inch thick. An interesting finding also was that the sheet metal could frequently be coated with finishes such as vinyl plastics and some paints before drawing without injuring the finish.

## Greater Use of Die-Casting Proposed to Lower Machining Costs

REATER use of accurately formed G die-castings to eliminate machining operations on all kinds of parts was advocated by Charles Franklin, Rochester Products Division, General Motors Corporation, Rochester, New York.

ON THIS

tions.

head.

661 State St. Ext.



## JIG BORING! PUT SMALL JOBS LINLEY MACHINE Pays for itself on die, jig and fixture work as well as molds for plastics, metal pattern work, laying out drilling, milling and boring opera-Fast and simple with correct speeds to insure safety to tools. Ball bearing equipped; micrometer screw feed Write for Bulletin M. LINLEY BROS. CO.

Bridgeport 1, Conn.

PAWTUCKET, R. I.

222 EAST ST.

Recent advances in the art of diecasting, according to Franklin, have made it possible to hold closer tolerances than in the past. Holes can be



Chas. Franklin

"cast into" diecast parts to a size equal to that of drilled and reamed holes when produced by machining, he said. Holes as small as 0.028 inch in diameter and 5/64 in ch deep have been cast successfully in thousands of

parts, Mr. Franklin stated.

Small tapered holes almost 3 inches deep can also be produced with relative ease, he said. Even lower production costs than formerly are now possible with die-casting, Franklin claimed, pointing out that most die-casting ma-

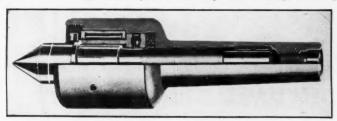
chines are now completely automatic in operation. This has been accomplished in part by making the dies in the machine operate practically like "machines" with such moving parts as side slides, core pins, ejector pins, ejector slides, re-entry slides for ejection, cam followers, and so on. An interesting development directed at lowering die cost for such machines is in the form of experiments now being carried on with dies made of alloy cast iron, Mr. Franklin said.

Ford Produces 3,000,000 Valve Guide Bushings per Month Almost "Untouched" by Human Hands

HOW "Automation"—the automatic handling of parts in production without physical effort by the operator—has been applied to the production of 3,000,000 parts a month, all far more alike than two peas, was detailed by N.

## Are They True?

Yes, MOTOR TOOL LIVE CENTERS run true and without chatter because the combination of large spindle, small head, short overhang and even distribution of bearing surfaces provides exceptional strength and rigidity.



The Exclusive RED BAND OVERLOAD INDICATOR is another one of the many advantages of these Live Centers that insures long life and outstanding performance.

Send for descriptive bulletin covering advantages, features, sizes and prices.

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## Variable Ratio Pantographs, Pantograph Controlled, Profiling Vertical Millers.

For Contour Milling, Profiling, Intricate Cams, Calibrating, Die and Mold making. Engraves on curved surfaces without special templates, with smooth lines in any design, number, letter; on iron, brass, copper, aluminum, soft steels and all plastics • Drills a series of holes • Increases accuracy and production • Etches glass and similar items • For information and prices with Dept. M.

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Single or multiple diameter pieces. High Quality Work Since 1931. Prompt Service.

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L. Bean of the Ford Motor Company, Detroit, Michigan.

The parts—valve guide bushings for V-8 engines—were selected as "Guinea pigs" by Ford. The object was to work

out methods and equipment for reducing physical labor on all kinds of parts required by the tens of thousands a day.

The result is highly interesting. Only once in the entire production line are the bushings touched by hand and even



N. L. Bean

this single manual operation out of dozens performed automatically on 3,000,000 bushings a month may soon be "automatized."

## New Man-Made Materials Open Up New Fields

A FASCINATING new group of man-made materials called "Metamics" (from metallic ceramics) was described by W. O. Sweeny, Jr., Haynes-Stellite Division, Union Carbide and Carbon Corp., Kokomo, Indiana.

The new materials developed only since the end of the war are neither ceramics nor metals but are a combination of the two. According to Mr. Sweeny they are produced similarly to powder metals and have two outstanding characteristics; they will stay solid at temperatures where metals are molten and they will not crack or break like ceramics when heated suddenly to high temperatures or rapidly cooled. They also possess interesting electrical characteristics, Sweeny said.

A typical material in this group, made from chromium metal and alumina ceramic, is being tried for a number of parts in ram jet airplane engines, for turbo supercharger blades, gas turbine nozzles, and so on. In some of these applications temperatures as



W. O. Sweeny, Jr.

high as 3000 deg. F. are encountered. Ordinary metals would melt at such temperatures. One advantage of the metal ceramics over some other materials which have been tried for these applications is that they are apparently easy

to machine—particularly when tungsten carbide tools are used.

-0-

**Higher Machine Speeds to Cut Costs** 

HIGHER machine speeds and feeds offer a possibility of material decreases in manufacturing costs, according to R. T. Hurley, President, Curtiss-Wright Corporation.

"To take advantage of such speeds



R. T. Hurley

we will have to learn a lot more about the machinability of various materials," Hurley said. "We must know how to control it and the machine should be properly equipped to handle the higher production speeds possible."

Among machine requirements Hurley cited as particularly important were: power, rigidity, tool and work support, balance of rotating parts, and freedom from vibration.



## THEY GRIND-NOT JUST RUB!

The RPM's stay up while grinding...
not only when the grinder runs idle.
It is an established fact that surface
speeds must stay up to approximately
a minute if you want to grind... not
just rub. Every mechanic knows this,
but an inexperienced buyer may order
tools that maintain proper grinding
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speed of Kipp air grinders drops but
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better work... longer wheel life.

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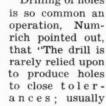
Write for KIPP Air Tool Catalog AT 3006

## Even Holes Can Be Made Cheaper

OST of producing accurately fin- ished holes in production can be greatly reduced by proper tooling according to Eugene Numrich, Appli-

cation Engineer. Avey Drilling Machine Company, Wood-Ridge, New Jersey.

Drilling of holes



reaming, broaching, grinding or lapping operations follow, depending on the job."

Eugene Numrich

By giving more attention to the grinding of the drill and use of suitable guide bushings to align the drill during the cut, holes can frequently be produced to an accuracy and finish which will eliminate subsequent operations without increasing drilling time in any way, Numrich said.

In his paper Numrich described the great variety of drilling equipment which has been developed to make possible lower-cost drilling of holes under all kinds of requirements. Specific characteristics of each were described.

## Sheerer Hose Possible with Almost Invisible Drills

RILLS so small that it takes 20power binoculars to watch them at work are opening new possibilities in the production of al kinds of consumer goods, according to J. A. Cupler II, General Manager, National Jet Company, Cumberland, Maryland. Mr. Cupler said that the manufacture and use of such drills has already reached the





PIPE and TUBE CUTTING

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point where millions of minute holes are drilled with them every month in some industries.

The "micro-drills" are capable of producing holes as small as about onethousandths of an inch in diameter.



J. A. Cupler II

Among the many uses found for such holes is the drilling of minute dies for squeezing synthetic silk materials into fine synthetic threads. The accurately made steel drills used for such holes are far thinner than a human

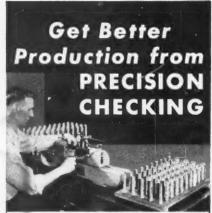
hair and operate under pressure so light the operator can hardly feel it. Nozzles of dual injection engines also require extremely small holes. The first major application of micro-drilled holes in the medical field is the new "hypo-spray" for hypodermic ejections.

# Cold Roll Forming of Metal Parts Advocated to Cut Costs

L OWER production costs for such things as metal trim, mouldings, building parts, corrugated materials, and so on, for automobiles, appliances, housing, and so on, are now possible by cold rolling these parts to shape from strip and sheet metal, according to E. J. Vanderploeg, Development Engineer, The Yoder Company, Cleveland, Ohio. Mr. Vanderploeg said that in producing formed angle stock one small punch press and one small roll-forming machine will with a single operator produce more parts than three power presses with three operators.

The process can be applied to materials up to  $\frac{1}{2}$  inch thick at present, to





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pipe up to 20 inches diameter and to steel plate up to ¾ inch thick and practically 8 feet wide, according to Vanderploeg.

It is even possible, he added, to finish the material before rolling it to shape, thereby further reducing costs. Among suitable finishes he mentioned galvanizing, plating, polishing and burnishing plus some organic finishes. Paints



E. J. Vanderploeg

won't work so far, however, he said, and parts to be painted would have to be formed first.

The machines which have been developed to do this work are capable of turning out parts at a rate of 30,000 feet of parts per day, automatically cut off to length as they come out of the machine.

-- 0 --

Automatic Presses Produce and Assemble Parts Without Being Touched STRIKING cost-cutting possibilities of using automatic machines to assemble parts instead of using manual labor were outlined by Herman Zorn,

President, V & O Press Co., Hudson, New York.

Mr. Zorn described how various parts can be first automatically formed in presses and then assembled with other parts fed into the machines by transfer described with



H. F. Zorn

vices, hoppers or the like. In this way certain sub-assemblies of manu-

factured products, he pointed out, can be turned out completely automatically. The raw material—such as strip steel—can be fed automatically into one side of the press and the assembled unit comes out of the other side, as many as twelve or fifteen operations having been performed in between.

In some cases the movement of an operator's hand is duplicated by a "mechanical hand" which has either fingers or vacuum cup to pick the part, move it into place in the machine and release it there. Such hands do not necessarily eliminate the operator but make his job easier and far safer since it keeps his own hands away from the machine. Some of the presses to which Zorn referred can perform as many as 1000 operations in a single minute.

-0-

"Automation" Applied to Forge Plants

O NE use of "automation"—the replacing of manual effort by automatic devices—is entirely feasible in

forge plants despite the large weight of the parts and the high temperatures encountered, according to Thomas E. Darnton and Willard L. Mantz of the





W. L. Mantz

T. E. Darnton

Oldsmobile Division, General Motors Corp., Lansing, Michigan.

Although "automation" is commonly a s s o c i a t e d more with machining plants, some 250 different types of forgings in quantities totaling over one million pounds per day are now handled with a minimum of manual effort



in Oldsmobile's forge plants, through the use of such devices as magnetic cranes, power conveyors, some 35 "finger" trucks which pick up and transport parts, overhead monorail conveyors—some over ¼ mile in length—automatic furnaces for heat-treating, slat conveyors and ever the old "block and tackle."

Some of the parts—such as crankshaft billets—have to move along on these conveyors while heated to around

CARROLL

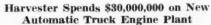
3 SIZES - 4 MODELS - 6" to 12"

Catalog

2300 deg. F. Ability to handle such parts mechanically of course greatly improves working conditions in forge plants, it was pointed out.

Some of the automatic furnace installations operate without requiring any manual handling of the work while handling approximately 100 crankshafts per hour. The same is true for washing installations for forgings and pickling baths.

-0-



THE use of highly complex interlocked "transfer" type machines which eliminate much of the manual handling of parts in process of manufacture does not necessarily increase capital investment cost, according to Joseph Olender, Mechanical Engineer, International Harvester Company, Indianapolis, Indiana.

Mr. Olender based his statement on Harvester's recent new \$30,000,000 tooling program to build new types of truck engines. The new setup employs transfer and single purpose automatic machines wherever possible and actually costs less than similar setup employing more general purpose machines, Olender said.

Other advantages of the new factory tooling, according to Olender, include greatly reduced materials handling costs, reduced floor space required, and increased production capacity.





Among some of the controls worked out are electrical interlocks with flashing lights to insure automatic correct locating and clamping of parts in machine, and safety devices which won't let a machine operate if an operator should not happen to be clear of the machines.

Biggest problem faced by manufacturers going to more automatic machinery, Olender said, is "down-time" of machines. Obviously if one machine of a group has to be shut down for any reason, the others usually also have to be shut down.

To decrease down-time to a minimum, Harvester has gone as far as possible to quick change tooling of machines, suitable for "pre-setting." These are kept handy in racks at machines to cut down-time for tool changes to a minimum. Magnetic set gages, removable guides and guide rails, and reconditioning of patterns and fixtures before they go into storage

are among other items intended to cut down-time.

A sharp increase in tool life has been

obtained by research in many cases, further decreasing frequency of machine shut-downs, Olender said. Another aid in this direction is the use of chip conveyors which travel below the floor and take the chips from machines



Joseph Olender

and automatically dump them into gondolas.

With the various innovations worked out, Olender said, it now takes Harvester an average of only 45 minutes to completely change the tooling of most of the large transfer machines.



All machines were, of course, carefully time-studied before being put into the line since accurate synchronization is so important in a setup of this nature, Olender said.

Unnecessary Motions Contribute to High Production Costs

IN order to obtain minimum production costs, tool engineers should predetermine the time required for every











H. K. Keever

movement required both by machines and by operators, according to N. M. Perris and H. K. Keever, Partners of Stevenson, Jordan & Harrison, Inc., New York City.

The speakers cited numerous examples where a slight change in the fixtures, clamps or other devices on a machine would cut the operator's time sufficiently to increase output per machine hour by 50 to 100 per cent. Much of the unnecessary time consumption, according to the engineering firm, is in the devices used for loading and clamping parts in a machine. Similarly, the authors pointed out, a slight change in one operation may greatly reduce the operator's time in another operation. In one case, for instance, just putting a slightly deeper marking nick in a part greatly reduced time in final assembly by making it easier for the operator to align the parts correctly. In many cases, they pointed out, greater economies can be effected by

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figuring out how to make the job easier for the operator than how to make the machine work faster.

> - o -Nitrided Tools

J. G. MORRISON, Chief
Metallurgist, Landis Machine Company,
Waynesboro, Pa.,
pointed out that
life of nitrided
tools varies from
two to ten times
that of untreated
tools, resulting in
considerable savings for industry.



J. G. Morrison

-0-

#### Chrome Plating May Increase Engine Power, Cut Service Troubles

CHROME-PLATING, familiar to everyone because of its lavish use to decorate outside of automobiles, is being used now also on parts that don't



B. A. Taylor

show, to reduce their cost and increase their life—it was revealed by B. A. Taylor, Vice President, Chrome Electro-Forming Company, Detroit, Michigan. Taylor explained that experimental tests showed that the life of automo-

bile piston rings can be multiplied five times and cylinder wear can be reduced two-thirds by the use of "hard chrome" plating on only the top ring in each cylinder. The reason given for this was that the plated surface had a natural lubricating quality which prevents the more rapid wear and scoring of the top ring because of its nor-

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123A	fe"	9"	10	3.50				
124A	5/8"	10"	की	3.50				
125A	3/4"	11"	3/4	4.35				
126A	18"	13"	1,5	6.30				
127A	1"	14"	ń	6.30				
128A	11/8"	16"	3/8	8.75				
129A	14	18"	3/8	12.30				
130A	11/2"	23"	1/2	16.30				
176A	17/8"	30"	5/8	36.35				
155A	21/2"	36"	3/4	72.70				

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# GLOBE PRODUCTS MANUFACTURING CO.

3380 Robertson Blvd., Los Angeles 34. California, U.S.A. mal lack of proper lubrication in automobile engines.

Other places where hard chrome plating has been of major value, according to Taylor, include outboard engine cylinders. A cylinder bore plated with only half of a thousandth of an inch of chrome, he said, gives an outboard engine enough additional power to equal a one-third higher operating speed of the propeller.

In applying the plate, Taylor warn-

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ed, it is much better to plate the part to the exact size desired rather than put on an excess and then grind it off. In the latter case life is cut in half, he said.

#### Broaching Process Being Widely Adopted to Cut Production Time and Costs

--- 0 ---

VAST reductions in manufacturing time and cost are being achieved on all kinds of products through the use of "broaching," according to O. W.

Bonnafe, Chief Research Engineer, LaPointe Machine Tool Co., Hudson, Mass. Mr. Bonnafe said that rifling of gun barrels for instance had been cut from over ½ hour per barrel to only 28 seconds. In producing T-



O. W. Bonnafe

shaped holes in forgings, requiring the removal of 75 lb. of metal in the form of chips, time was cut from 65 man hours to only 20 minutes.

Again on a large internal clutch, installation of broaching equipment paid for itself in time saved on the first few dozen parts produced. Bonnafe said.

A radio manufacturer cut the time

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37 FARRAND ST. BLOOMFIELD, N. J.

required to produce certain stamping dies from one month to only 30 seconds. In producing connecting rods a single broaching machine replaced 7 milling machines and gave greater production, he said. In another case the number of machines eliminated by broaching equipment for producing textile mill rolls amounted to a 95 per cent reduction in floor space required. The broaching machine, in addition, turned out more accurate rolls with a better finish.

Quick replaceable and adjustable broach sections and use of tungsten carbide in finishing sections were among the items cited by Mr. Bonnafe as contributing to further raising productivity per hour and day of broaching machines.

#### -- 0 --Complete Mechanization of Plants Far Off

RECENT forecasts that the day is rapidly approaching when all kinds of products can be turned out without any manual handling were discounted by C. E. Kraus, President, Kraus Design, Inc., Rochester, New York.

"Complete mechanization of plants, where raw material is dumped into an automatic line at one end and the finished product comes out of the other ready to ship to the consumer, is theoretically possible or practical in only occasional instances," Kraus said.

Advocating the principle of making haste slowly, Kraus admitted that vast cost reductions in the manufacture of all kinds of products are possible with better materials handling. However, he pointed out, the investment cost in the equipment required may in many cases far more than offset the savings in manual effort.

Even in feeding a part into a machine, he explained, the sorting mechanism may be extremely complex. Only a ball, he pointed out, can be fed into



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a machine without its ever being "wrong end to." On the other hand there are seven wrong ways and only one right way in which some rectangular parts can enter a machine. This means that automatic sorting mechanisms must first arrange the parts according to one "direction," then another, and a third, and so on.

Nevertheless, he urged tool engineers to concentrate on studies of automatic handling mechanisms. "Experi-

ence in using and maintaining such equipment must be developed," he pointed out, "just as experience in

operating a n y other kind of high production tools. While some of the simpler hoppers can be applied almost anywhere, experience becomes more and more essential as complications increase."



C. E. Kraus

Automatic materials handling mechanisms

may in many cases serve to cut initial investment for new machines, however, Kraus pointed out, since they sometimes permit a few machines—operating more efficiently—to do the work of the many otherwise required. In some cases simple loading devices on a single machine have doubled and tripled production by making the job easier for the operator, he added.



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#### Airplane Design Costs Can Be Cut by Tool Engineering

NOT only the cost of the final prodduct but also the cost of designing that product can be cut simply by applying manufacturing principles to the creation of the design, according to John Van Hamserveld, Supervisor of



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C. and high speed
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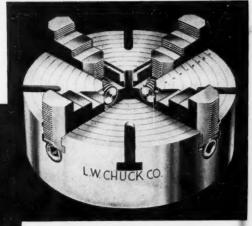
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5"	\$25.30	Weight	Jaw Width	12"	\$ 57.35	75 lbs.	11/4"
61/4"	\$35.20	9 lbs. 18 lbs.	1/2" 3/4"	14"	\$ 66.65	91 lbs.	11/4"
71/2"		25 lbs.	3/4"	16"	\$ 87.65	140 lbs.	11/2"
101/2"	\$92.60	70 lbs.	1"	18"	\$115.55	160 lbs.	11/2"

L-W CHUCK COMPANY 28 SO. ST. CLAIR ST. TOLEDO 4, OHIO

Design Cost Control, Glenn L. Martin Company, Baltimore, Maryland.

"Designing is a form of manufacturing." Mr. Van Hamersveld pointed out. "To cut costs we just step up efficiency as we do in a plant-by providing the designer with the proper design technique, processing methods and equipment."

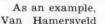
"To the designer any information useful to him in designing a part is a "tool." The more and better tools we can give him, the easier his job, the better and lower cost is the productin this case the thousands of drawings needed for any airplane."

Glenn L. Martin has already applied the principles in practice. Van Hamersveld said. Included in the "tools" provided are bulletins which give the designer information on materials costs, standard parts available and "economic design" information-all in quick reference form.

Such information enables the design-

er to compare quickly what the same basic part would cost designed for production by any one of several methods

and in different quantities. The costs include labor and assembly in production, make allowances for reworking of parts, scrap, supervisory costs, tooling costs and testing, and so on.





I. Van Hamersveld

showed four designs of one of many airplane fittings. These designs called for the same part to be produced respectively by forging, welding, casting and from bar stock. The costs of the particular fitting ranged from \$4.19 each in lots of 100 to \$10.99 each, according to the production method called for by the design.





P. O. BOX 132-MS

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#### Rigidity of Machine Parts

scientific mathematical analysis of the rigidity of certain machine



Dr. M. Kronenberg

parts vital to accurate production at high speeds was presented by Dr. Max Kronenberg, Consulting Engineer, Cincinnati, Ohio.

The analysis was made, according to the author. to indicate ways in which other

machine parts may be studied to improve overall machine performance.

-0-

#### **Eliminate Machining of Unmachinable Metals by Casting Parts to Size**

THE advent of jet engines and other industrial products has brought with them the use of practically unmachinable materials. When the job of



T. F. Frangos

figuring how to produce accurate parts of such materials was thrown at the tool engineer, he came up with a process called "investment" casting.

Progress in the use of the process which enables casting of metals

to "machined parts" tolerances—thus simply eliminating "machining"-was described by T. F. Frangos, Haynes-Stellite Division, Union Carbide & Carbon Corp., Kokomo, Indiana.

The process has now developed to a point where it can be used in mass production, producing parts to reasonably



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#### BROWN ENGINEERING CO.

120 N. THIRD ST. READING, PA.

close tolerances, Frangos said, adding that the greater the permissible tolerance the lower the number of reject parts.

The process consists of making a pattern of the part out of wax or plastic, then using this pattern to make a mold. When the mold has hardened, the wax or plastic is simply "burned" out of the mold.

#### American Economic System Films

A program by which industrial and business firms can sell America's economic system to employees, schools and community groups through the use of colored sound slide films is being launched by Ross Roy, Inc., 2751 E. Jefferson Ave., Detroit 7, Mich. The program will be made available to every business and industrial firm in the country. Each film will be a complete story in itself, but will also have the "series effect" of building a historical argument for the American Economic System.

The program takes a new approach to economic education. Each film has been written in an easy-to-understand manner at the teen-age level. To explain the fundamentals of economics, the films take the typical American family of Tom Smith back through history to show the constant struggle for freedom. One film shows that the free democracy of the Athenians and the communistic state of the Spartans of ancient Greece were very similar to the contrast today between the United States of America and Soviet Russia.

The program will be offered subscribers in a package form consisting of six films, including records and "take home" booklets reviewing each film.

For further information on any product mentioned in this issue—use the READER SERVICE CARD between the covers.





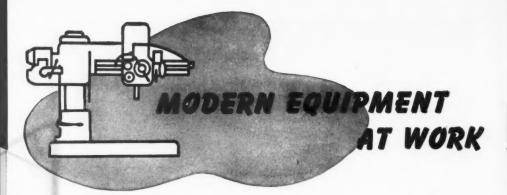


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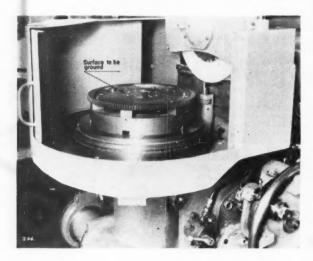
### Grinder for Automotive Flywheel

THE accompanying illustration shows an Arter Model D-16 rotary surface grinder being used at the Buick Motor Division of the General Motors Corp. for grinding one surface of a flywheel. The grinder is a product of the Arter Grinding Machine Company.

The flywheel to be ground has a hot rolled steel body to which a ring gear is brazed. The only surface ground in the grinding operation is a ring-like section which surrounds the hole in the center, this surface being the one which is bolted to the crankshaft. The fixture for the grinding operation was designed by Buick. Essentially, it consists of a series of six pins which are slightly smaller in diameter than six of the holes near the rim of the flywheel body and which are mounted radially in the fixture. At the top of each of these pins is an inclined notch. In operation, a flywheel is dropped over these pins, and then it is rotated slightly in a counterclockwise direction so that the edges of the holes

in the thin wall of the body section are positioned positively against the sides of the notches. This action forces the workpiece down onto locating blocks.

While the general construction of the grinding machine is standard, it has been constructed so that the flywheel is ground in one controlled grind-



Shown here are the main features of Arter surface grinder used for grinding Buick flywheels. ing cycle. The cycle ends with the grinding wheel in front of a diamond dressing tool, as may be seen in the illustration. After the work is loaded and a push botton is pressed, the grinding wheel is carried forward rapidly over the section of the work which is to be ground; automatically and by means of an hydraulic system, the work table is elevated quickly to grinding position, this fast movement being necessary since the surface to be ground is lower than the face of the ring gear.

Next, automatically and hydraulically, a nut gear mounted on the work table elevating screw is rotated by means of a piston rod with rack teeth cut therein. This slow feed grinding movement is made with the grinding wheel revolving at a stationary position. That is, it is a plunge cut operation without oscillation of the grinding wheel. This movement ends at a positive stop where there is a dwell con-

trolled by a time delay switch.

Next, the work table is rapidly lowered; and the grinding wheel is moved rapidly back to a position in front of the diamond dressing tool at which point, by means of a cam, it is slowed down to wheel dressing speed. The wheel is moved across the diamond, automatically reversed, moved forward across the diamond, and then stopped automatically. Before each pass of the grinding wheel over the diamond, the work table on which the diamond holder is mounted is moved up automatically 0.001 inch. The point of the diamond is set in relation to a reference point representing the specified finished thickness of the work. Thus wheel dressing after every operation assures that the thickness of each piece is maintained without measurement on the machine. The conventional handwheel on the table is provided for any hand movement of the work table which may be necessary.

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#### Deep-Throat Foot Press Used to Punch 4-Foot Sheets

THE Salt Lake City branch of Chicago Bridge and Iron Company recently purchased from the Whitney Metal Tool Company, Rockford Ill., a four-foot throat depth foot press for use in punching holes along the edges of standard 4-foot sheets of hard, compressed composition board. Punching holes in such board is said to produce



Deep-throat foot press designed for punching holes in 4-foot sheets

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much cleaner results than drilling because of the tendency of the board to tear.

Although the large sheets could be punched on ordinary presses, it would require two operators and make for awkward handling and inaccuracies. With the deep-throat foot press, a single operator is able to handle the same work more efficiently and quickly since he can slide the sheet into the extra deep throat and thus work along the near edge. This puts the operator in a normal position to see his locating marks and to easily work the foot pedal.

The press is of all-steel welded con-

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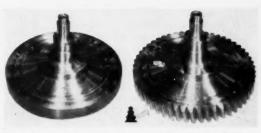
Fig. 1—Before and after views of a broached turbine wheel. The shape of the slots is also shown.

struction with a frame cut from heavy steel sheet and a sturdy stand fabricated of angle iron. The punch is operated by a pedal through a powerful lever and toggle links

powerful lever and toggle linkage that multiplies the foot pressure many times. The standard punches and dies used are quickly interchangeable through a wide range of sizes.



S HOWN in Fig. 1 are views taken before and after broaching of a 316 stainless steel turbine wheel which is used on a gas turbo engine.



53 Xmas tree-shaped slots are broached around the periphery of the 11% inch diameter wheel. The slots, which are used to hold the turbine blades, are  $\frac{1}{2}$  inch deep; and the length of cut required is 1% inches. The turbine wheels are not produced in large quantity lots, and therefore economy of operation was of prime importance in tooling for the job.

A standard American 54 inch stroke ten ton single ram machine, which is shown in Fig. 2, was selected for the broaching operation. The



broach tooling consists of rough and finish insert assemblies which are mounted side by side on a single holder unit. A work holding fixture, which is designed to hold the work at a 12 degree angle in relation to the machine slide travel, is mounted on a special receding work table. A feature of the fixture unit is the fact that an operator is able to position the work laterally from the rough station to the finish station without removing

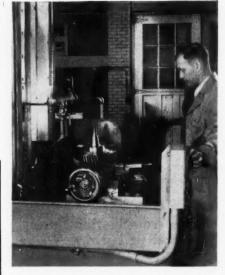


Fig. 2—Broaching machine used for broaching the turbine wheel shown in Fig. 1.

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the workpiece from the fixture plate.

The operating sequence required to broach one turbine wheel is as follows:

- The part is secured on a manually indexed fixture.
- 2. The angular slots are rough broached around the entire periphery of the wheel at the first station.
- 3. The complete fixture is then traversed laterally to the second station for broaching Xmas tree-shaped forms.



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#### Special Drill Head Used for Production Drilling of Forage Harvester Parts

A SPECIAL fixed-center multiplespindle angular drill head is now being used in the La Porte, Indiana plant of the Allis-Chalmers Manufac-

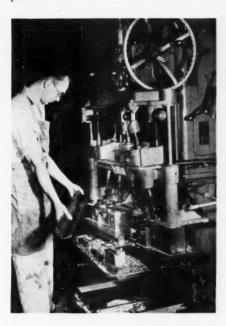
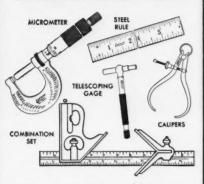


Illustration showing equipment used in La Porte, Indiana plant of Allis-Chalmers Manufacturing Company for drilling angular holes in forage harvester components

turing Company for drilling a component of the Allis-Chalmers forage harvester. As shown in the accompanying illustration, the drill head, which was designed and built especially for the job by the Thriftmaster Products Corporation, is used to drill four \( \frac{5}{8} \)-inch holes in alloy steel at angles varying between 4 and 13 degrees on each side of the perpendicular. With the equipment illustrated, parts are produced on a volume basis.



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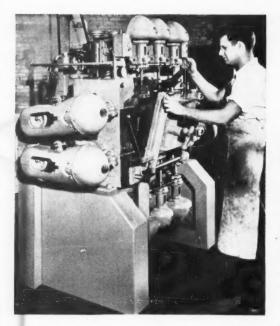
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Ten standard Delta units are used on a special machine for drilling castings.

#### Plant Uses Its Own Product to Reduce Labor Costs

RECENTLY the engineering department of the Delta Manufacturing Division of Rockwell Manufacturing Company, was confronted with a problem of finding a method of machining castings which were to be used for the tables of new tilting-arbor saws. Eighteen holes were to be drilled in the four sides and bottom of each casting, and a substantial production schedule had been planned.

The Delta engineering department made a study to compare the costs of three different methods of handling the job. The first two methods involved the use of machine tools in the plant and a series of jigs, and included several separate handlings of each casting. The third method called for the use of a special single-purpose machine, using standard Delta units and other standard mechanisms. The third

method was the one selected, and the special machine is shown in the accompanying illustration.

While the selection of the third method meant a somewhat greater initial cost, its use resulted in a considerably reduced labor cost. Cost comparisons for the initial run show a labor cost of 14 and 18 cents per casting respectively for the first two methods as compared with five cents per casting for the third method. In addition to the labor savings involved, another

influencing factor which was considered in selecting the use of this special machine was the fact that machine tools which would have been needed for these drilling operations are now available for use on other machining jobs.

It may be noted that the ten drill heads which are mounted around the periphery of the machine are standard Delta units. Many other Delta parts are also used. The machine is completely automatic, requiring only the operations of loading and pressing a button in order to start a work cycle.

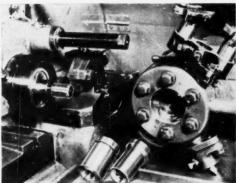
# Precision Mandrel Adapted for Second Operation Work

A UNIQUE application of an Erickson precision mandrel recently made it possible for a leading manufacturer to perform second operation work at a high production rate on a Brown and Sharpe automatic. The op-

Precision mandrel is used on automatic for second operation job. Before and after views of the workpiece may be seen in the foreground.

eration was that of turning the O.D., facing, counterboring, threading, and chamfering the I.D. and O.D. of a brass part. Before and after views of the part may be seen in the foreground (left and right, respectively) of the accompanying illustration.

The cycle time required for these operations has been reduced to 30 seconds, with the result that production costs for the part have been reduced to a fraction of what they were formerly. The operator needs only to load the machine and remove parts after the operations are completed. Five operations are now completed in the time which was previously re-



quired for a single operation.

This special application of an Erickson precision mandrel have added versatility to the Brown and Sharpe automatic, thus making production economies of this machine available for a wider range of jobs. The precision mandrel is produced by Erickson Tools Division.









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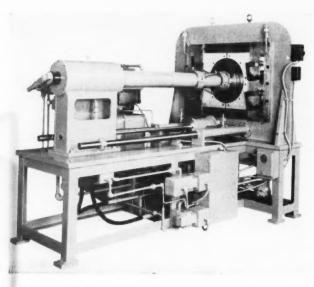
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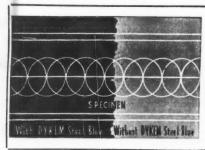
Heater Tubes Corrugated on Special Hydraulic Machine

CUTTING corrugations in metal heater tubes is one of the unique jobs assigned to oil-hydraulic power. A production forming machine specially designed and built by The Dension Engineering Company for Surface Combustion Corporation, both of Columbus, Ohio, corrugates heater tubes of various sizes up to 13½ inches inside diameter. The dies are interchangeable. All movements of the unit are controlled through standard Denison hydraulic components.

In a heater tube 30 inches long, there are about 70 corrugations. Each is made in approximately 6 seconds by the dies opening and closing on inner and outer surfaces of the metal. Hydraulically actuated cylinders close the 4-piece outside dies and expand the inside dies. When force has been applied according to preset pressure set-

ting, the inside dies retract and the outside dies open automatically. The tube is then advanced a predetermined distance by another hydraulic cylinder. This distance can be regulated as desired. A work-holding device supports the tube during the corrugation. The machine continues to cycle automatically with the dies opening and closing on the tube throughout its entire length.

This oil-hydraulic production equipment operates at 1,000 p.s.i. with power from a pumping unit of 9 g.p.m. capacity. Control and sequence valves



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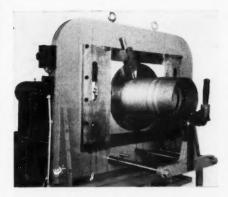
Simply brush on, right at the bench; ready for the layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, and at the same time prevents metal glare. Increases efficiency and accuracy.

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End view of special hydraulic machine, showing metal heater tube in the process of being corrugated.

are of standard design. The entire machine is said to be an example of the varied special equipment that can be built around Dension regular-line components.

# Comparator Increases Inspection Rate to 1,000 Parts Per Hour

The Winchester Repeating Arms Co. of New Haven, Conn., has installed a General Electric magnetic comparator for the production line testing of stock steel and small metal parts; and since the installation of the comparator, the inspection rate for these parts has been increased to approximately 1,000 units per hour. The company is a leading manufacturer of small arms, ammunition, flashlights, dry-cell batteries, and various specialty items.

Previously, the classification of these parts was determined by means of various spot checks and tests which required from one-half day to several days to complete, and usually these tests used destructive methods. In contrast, all of the parts may now be checked with the comparator, and

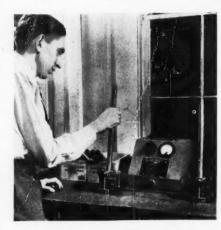


DETROIT POWER SCREWDRIVER CO.

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none of the specimens is damaged since the test is a non-destructive one. The comparator is used to compare rods, bolts, springs, and small fabricated parts with a preselected standard of the same size and shape in order to detect differences in composition, heat treatment, or other characteristics which might alter the resistivity or magnetic properties.

As shown in the accompanying illustration, the equipment consists of two



A steel tube sample is checked by using a G-E comparator

external test fixtures and a portable steel case which contains an indicating instrument: the test fixtures are two identical coils of wire. In operation, a sample standard of known composition is placed in the center of one coil, and the part which is being tested is placed in the center of the other coil. The comparison of the two parts is then shown by the indicating instrument. For larger parts, such as forgings, a pair of gage heads is used instead of the coils, the heads being rested on the surfaces of the parts being compared. The power supply required is 100 watt, 115 volt, 60 cycle. It has been said that the comparator





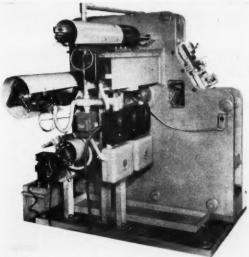
equipment. Walton Tap Extractors have been used for years by toolmakers and mechanics all over the world. They are easy to use, fast, and economical.

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readings are so sensitive that two steel

samples may be distinguished if there

is a difference of even two points in their Rockwell hardness numbers.

Fig. 1 - Semi - automatic machine equipped with five special Black units.

#### Semi-Automatic Machine for Bicycle Cranks

C HOWN in Fig. 1 is a semiautomatic machine which is used for performing four operations on bicycle cranks. A typical crank may be seen in Fig. 2. The machine is equipped with five special production units which are manufactured by the Black Drill Company. Three of these units are used for milling and

drilling; two are used for tapping. All of the units are operated by air, and they incorporate hydraulic checks for feed control.

Speed up scraping operations with these efficient blades. They are especially good for hard alloy iron and the extremely hard bronze castings. If you are already using Anderson Hand Scrapers it is not necessary to buy complete new scrapers in order to use carboloy tipped blades. Simply remove the high-speed steel blade and slip in the Anderson Carboloy Tipped Blade. They are available in three widths.



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The operations performed on a crank are as follows; hollow mill a driving lug using a 3/4 h.p. unit with a six inch stroke operating at 1150 r.p.m.; drill and spot face two pedal holes using two 3/4 h.p. units operating at 840 r.p.m.; and tap the two pedal holes, one with right hand and one with left-hand threads, using standard Black tapping units operating at 540 r.p.m.

All five of the Black units on the

machine are operated electrically through solenoids and limit switches. Thus, none of the units may be ad-



Fig. 2-A typical bicycle crank.

vanced until the machine is indexed properly; and the machine is not indexed until all of the units are returned to "at rest" positions. The use of the semi-automatic machine has resulted in reduced production costs and in greater uniformity of the finished bicycle cranks.



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#### Studs Welded to Filter Housings

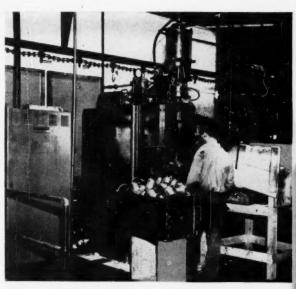
SHOWN in the accompanying illustration is a Thomson projection welder which is being used in the plant of the Commercial Filters Corporation manufacturer of Fulflo filters. The machine, which is equipped with Westinghouse three-phase, lowfrequency control, is used to weld a stud to the base of a cylindrical filter housing. The stud is so positioned that it extends into the hollow interior of the housing. The production rate obtained is 300 pieces per hour.



Thomson projection welder equipped with Westinghouse control.

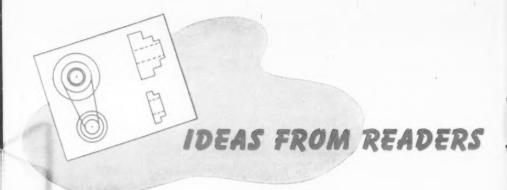
The welding control of the machine contains six ignitron tubes that convert the three-phase, 60-cycle current input into a single-phase, 12-cycle output. The principal advantages claimed for the welding control are (1) distribution of the power load among the three phases, thereby reducing the demand, and (2) improvement in the quali-

ty of the finished product because of the reduced rate of rise of the lowfrequency welding current.



For further information on any product mentioned in this issue—use the READER SERVICE CARDS between the covers.





#### Boring Fixture for a Connecting Rod

By ROBERT MAWSON

A CONNECTING rod which is used on an air compressor is shown in the illustration, Fig. 1. The holes in the ends of the rod are bored, and the boring fixture which is used for this operation is shown in Fig. 2; a connecting rod may be seen in phantom.

The fixture is made with a cast iron base, A, which is cut out and machined to accommodate various work positioning and work holding units. A slot is machined across the bottom of the base; and a machine steel key, B, which is held in place by means of three flat head screws, is fitted in this slot. Four

holes, C, are drilled in the base through which bolts are passed for attaching the fixture securely to the machine table.

The small end of the connecting rod is positioned vertically on a machine steel, carbonized and hardened rest block, D, which is attached to the base by means of two flat head screws, E; and it is positioned horizontally against an Allen type set screw, F, which is located in a projection of the base and held in place by means of a hex nut. G. To hold the small end of the connecting rod in position, a work holding strap, H, is located on the left upper surface of the base. This strap is held in place by means of three parts—a steel stud, I, which is passed through a hole in the strap and thread-

> ed into a tapped hole in the base, a tension spring, J, which is positioned on the stud s haft between the base and

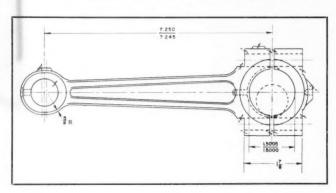


Fig. 1—Drawing of a connecting rod which is used on an air compressor

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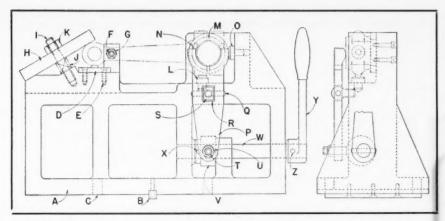


Fig. 2—Drawing of a boring fixture designed to be used for boring the two holes in the connecting rod shown in Fig. 1

the under surface of the strap, and a steel hex head nut, **K**, which is threaded onto the end of the stud.

The large end of the connecting rod is positioned vertically on a tool steel, hardened shoulder pin, L, which is fitted into a reamed hole in the base. It is positioned horizontally against a machine steel, case hardened special collar, M, which is attached to the base by means of four Allen type set screws, N, and also against a tool steel, hardened shoulder pin, O, which is driven into a reamed hole in a base projection. The large end of the connecting rod is held against collar M by means of a special machine steel lever, P, which is allowed to rotate on a steel pin, Q.

Pin Q, which is passed through two reamed holes on either side of opening R in lever P, is maintained in position by also being passed through the eye of a machine steel eye bolt, S, which is located in opening R and which is threaded into a tapped hole in the base.

A hole is tapped on the lower end of lever **P**; and a short stud, **T**, is positioned in this hole and held in place by means of a steel hex nut, **U**. The location of stud **T** is designed so that the inside end of the stud will contact a machine steel, case hardened eccentric, **V**, which is held on a steel shaft, **W**, by means of a steel pin, **X**. Shaft **W** is passed through three holes which are reamed in base projections; and a cast

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iron handle, **Y**, is fastened onto the end of the shaft by means of a steel pin, **Z**.

The machine in which the boring operation is performed is a Simplex Boring Machine. Four spindles are used, two on each side of the connecting rod; one pair of spindles carries the roughing heads, the other carries the finishing heads and both pairs of spindles are set up to assure the proper distance between centers. In operation,

the fixture is first located on the boring machine table by placing key **B** in a table slot and secured in place by tightening the nuts on four tee head bolts which are passed through holes **C**.

A connecting rod to be machined is next placed in the fixture, being positioned vertically on block **D** and on pin **L**. Strap **H** is tightened against the small end of the workpiece by tightening nut **K**, and the tightening action forces the connecting rod against set

screw F and also against pin O. Handle Y is then rotated to bring the large radius of the eccentric V in contact with stud T. and this movement results in the rotation of lever P about pin Q to move the lower end of the lever out and the upper end of the lever in. The upper end of the lever thus forces the large end of the connecting rod against collar M, and the workpiece is now held securely.

The machine is started in operation, the table is moved and the connecting rod is fed into the revolving rough boring heads. After the two holes have been rough bored, the table travel is reversed, and the connecting rod is fed



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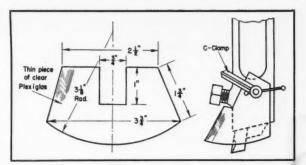
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into the finish boring heads. When the two holes have been finish bored, the table is moved to a neutral position, handle Y is ro-

tated to bring the small radius of eccentric V in contact with T and rotate lever P to its original position, and nut K is unscrewed to release strap H. The finished connecting rod is then removed from the fixture.

With this boring fixture, there is a minimum amount of time lost in placing and removing the connecting rods; and, also, the work is located accurately and held securely.



#### Simple Shaper Tool Guard

By A. W. PAYNE

A SIMPLE and inexpensive yet very effective shaper tool guard is shown in the sketch herewith. The guard is cut from a thin sheet of clear Plexiglas to the dimensions shown, and it is then bent to a U-shape and attached to the shaper tool holder as indicated, with a C-clamp. The guard acts as a shield in keeping hot shav-

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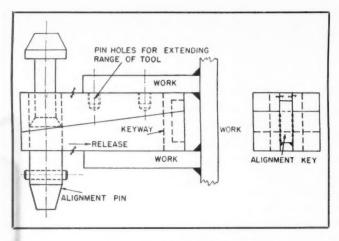






THE CHALLENGE MACHINERY CO.

GRAND HAVEN', MICHIGAN, U.S.A.



Sketch of collapsible welding spacer

be maintained. The usual procedure is to use a solid spacer for holding the parts in the desired position during tacking (or welding). However, after tacking is completed, weld distortion has locked the spacer firmly between the

parts. Removal of the spacer is then a time-consuming job and often results in the burring or "mushrooming" of

the spacer.

Considerable time can be saved by employing one or more wedge-spacers of the type illustrated in the accompanying sketch. The spacer comprises a steel block, approximately 1/4 inch wider than the distance to be maintained between workpieces, which is milled on one end to accommodate a key and drilled and reamed, or bored. on the other end for an alignment pin. After these operations are completed. the block is split on a band saw or milling machine at angle ranging from 7 degrees on up, depending upon the design of the spacer. A key is then welded

ings from hitting the eyes and face of the operator and in keeping the floor around the machine reasonably clean; it is particularly useful in those plants in which the salvage of shavings is stressed.

## Welding Spacer Collapses for Quick Release

By H. G. FROMMER

HE welder, like the machinist, needs proper tools to enable him to discharge his duties efficiently. Frequently, he has the task of making a weldment in which a specific distance between two or more components must



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into the keyway of one half of the block so that a clearance of about ¼ inch is provided between the key and the bottom of the keyway. The two halves of the block are matched and machined for the correct spacing dimension, and an alignment pin is made and inserted into the hole in the end of the spacer, which is then ready for use.

The alignment pin is made with two diameters, one % inch smaller than

the other, to assure release of the wedge after welding is completed. Before insertion of the wedge into the work, the larger diameter of the alignment pin serves to maintain a correct spacing dimension. After completion of the welding operation, the pin is forced into such a position that the smaller diameter allows for a displacement of one wedge half, thereby effecting a spacing reduction. The pin is easily forced with one blow of a hammer, and the wedge half requires only a light tap to collapse.

The amount of collapse can be varied, according to the design of the spacer. A 7-degree split, together with a %-

inch diameter difference in alignment pin diameters, allows for a 0.023-inch collapse, while a 15-degree split and ½-inch diameter difference in pin diameters result in a maximum collapse of 0.064 inch. Experience has shown that 0.023 inch is fully sufficient for the greater percentage of average jobs, and even 0.015 inch has been found quite successful.

A single wedge-spacer may be readily adapted to a wide variety of jobs

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by either using additional loose spacers or by tacking spacers to the surfaces: also, by equipping the wedge-spacer with removable and replaceable pins of various lengths which are inserted in holes on one of the finished surfaces.

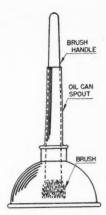
#### **Handy Bluing Unit**

By STANLEY WELLING

CONVENIENT and handy bluing and bluing brush unit may be made from an old oil can. The cap of the can is first unscrewed, and a portion of the spout is cut off. The handle of a long, round-handled brush is then pushed up through the spout until the brush is held securely. The can is then filled with bluing, the cap with the brush is screwed back on, and the unit is now complete. A sketch of the completed assembly is shown herewith.

A bluing unit of this type is particu-

larly useful in a shop since it is relatively unbreakable, since it cannot be tipped easily, since the cap is tightfitting thus reevaporaducing tion, and since the bluing brush is always in the same place. By using this type of unit, the amount of bluing consumed may be reduced, and neater operation may be obtained: large



Sketch of a bluing unit made from an old oil can

blotches of spilled bluing may practically be eliminated. Also, use of a longhandled brush tends to make the job of brushing easier.

#### **New Type Stripper Screw** Design

By L. C. FRIDDLE

IT is a regular practice in die design to use standard stripper screws for stripper plates, as illustrated by screw A and plate B in Fig. 1. A standard screw of this type has a shouldered thread and is tapped into the stripper plate. The movement of the stripper



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plate is controlled by means of the press ram, and on the upstroke the face of the stripper plate rises flush

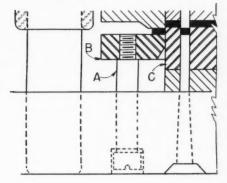


Fig. 1-Drawing showing standard type stripper screw and stripper plate

with the face of the punch, C. When the face of punch C is reground, adjustment must also be made in the stripper plate in order to retain the same relative positions on the upstroke. The standard practice followed in making this type of adjustment is to grind the face of stripper plate B and

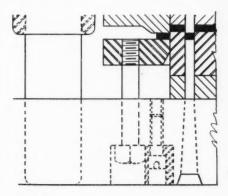


Fig. 2—Improved type stripper screw assembly

adjust the shouldered length of screw A to suit. These operations are time



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consuming, and therefore the following substitute method is suggested as an improvement.

Instead of using a stripper screw having a shouldered thread, a standard hex head cap screw is used which threads directly into the stripper plate, and an adjusting lock mechanism is provided so that grinding of the stripper plate is no longer necessary. This arrangement is illustrated in Fig.

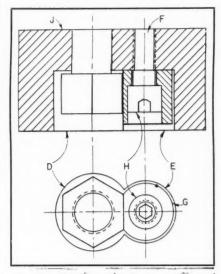


Fig. 3—Details of improved stripper screw arrangement

2. Details of the method may be seen in Fig. 3. Two holes, which overlap, are drilled in the die or punch holder, **J**, as shown, the larger one, **D**, to accommodate the stripper screw, and the smaller one, **E**, to accommodate the locking unit. A smaller hole, **F**, is drilled and tapped in the holder in line with hole **E**.

The actual locking mechanism consists of a bushing-like detail, **G**, on which one side is ground off flat, and a standard socket head screw, **H**. In operation, the stripper screw is adjusted until the proper position of the stripper plate is obtained. Detail **G** is

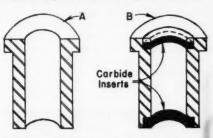
then slipped into hole **E** so that the flat surface is positioned against a flat of the hex head of the screw. Screw **H** is then inserted into **G** and screwed down into hole **F**. For readjustment of the stripper plate, details **H** and **G** are removed, the adjustment of the plate is made, and then the details **G** and **H** are returned to position. This practice eliminates the necessity of grinding the stripper plate and provides simple adjustment and positive positioning.

An Interesting Carbide Application

By ALEX J. PRECODA

IN manufacturing a certain bearing part, two 0.269 inch holes are drilled in each part prior to tapping. This drilling operation is a vertical one; it is performed in a Natco machine, and

eight drills are used in order to drill four parts at one time. Special bushings are provided through which the



Sections of bushings used for drilling bearing parts. A shows steel bushing formerly used; B shows carbide insert type now being used.

drills are guided to assure the proper hole locations.

These special bushings were formerly made completely of steel, as shown at detail A in the accompanying illustration. However, when it was seen that the rate of replacement was 33

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bushings in nine months, or an average of more than four replacements per bushings in nine months, it was decided to try a new type of bushing having carbide inserts. A complete set of bushings, such as the one shown at detail **B**, was installed; and, in five months, no bushing wear has been reported, and the troubles associated with worn bushings have been eliminated.

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The all steel bushings formerly used cost \$3.30 per bushing; the carbide insert bushings now being used cost \$11.00 per bushing. Therefore, for the bushings to be equal with respect to cost, a carbide insert bushing must last  $3\frac{1}{3}$  times as long as a steel bushing, or slightly more than seven months. From all indications, the new-type carbide insert bushings will last considerably longer than the required seven months.

These facts seem to prove that, for jobs having high rates of bushing replacement, consideration should be given to using carbide type bushings. Worn bushings only serve to increase the possibility for scrapped parts and broken tools.

#### Holder Prevents Damage to Small Tubing

By ROGER ISETTS

TOOLMAKERS who must use tubing smaller than  $\frac{3}{16}$  inch in diameter for making induction heating coils, and the like, will find an easily made holder, such as the one sketched in the accompanying illustration, useful for holding small tubing while cutting it off, for flaring it, and for similar operations. The holder eliminates the possibility of bending or flattening the tubing, and the tubing is held se-



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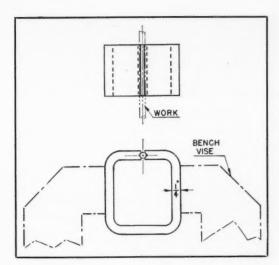
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Sketch of a simple holder for small diameter tubing

1/4-inch flat stock. Small vees are machined in each end of the long piece, and then it is bent into the shape of a rectangle. In operation, a toolmaker places his piece of small tubing between the vees of the holder, and positions the holder between the jaws of a vise. The vise is then drawn up, and the tubing is held securely.

curely enough for all practical purposes.

The holder is made from a piece of

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## News of the Industry

#### Hartford Special Machinery Company Elects Officers

Robert P. Merritt was elected president and Ernest W. Smith, Jr., was elected executive vice president at a recent directors' meeting of the Hartford Special Machinery Co., Hartford,



Robert P. Merritt (left) and Ernest W. Smith, Jr.

Conn., manufacturer of drilling, tapping, and swaging machinery, thread rolling and die polishing machines. Mr. Merritt has been with the company since his graduation from Williams College in 1933. He succeeds his father, the late Joseph Merritt, one of the original founders of the company.

Mr. Smith has been with the company since his graduation from the Harvard School of Business Administration in 1939. He spent five years in the Army, being separated in 1946 with the rank of major.

Other officers elected were William H. Storrs, vice president in charge of engineering, who has been with the company since 1924; Raymond J. Dunn, secretary and treasurer, who

started with the company in 1912; and Edward J. Sanderson, assistant treasurer and comptroller, who has been with the company since 1942.

#### Landis Tool Company Purchases Gardner Machine Company

S. F. Newman, chairman of the board of directors of the Landis Tool Co., Waynesboro, Pa., has announced the acquisition of the outstanding stock of the Gardner Machine Co., Beloit, Wis., by the Landis Tool Company. The flat surface grinding machines manufactured by Gardner are not competitive to the cylindrical grinders produced by Landis Tool. All manufacturing operations of Gardner Machine will continue in Beloit under the same management, and the company will operate as a separate corporation.

Officers of the Gardner Machine Company are M. A. Hollengreen, president; W. B. Leishman, vice president and general manager; C. Winslow Thompson, vice president and assistant general manager, and M. F. Frantz, treasurer.

#### S. E. S. A Spring Meeting

The Spring Meeting of the Society for Experimental Stress Analysis will be held at The Hotel Statler, Cleveland, Ohio, on May 25th, 26th, and 27th, 1950. Inquiries should be addressed to the Society for Experimental Stress Analysis, P. O. Box 168, Cambridge 39, Massachusetts.

#### Farrel-Birmingham Moves Buffalo and New York Sales Divisions

Farrel-Birmingham Company, Incorporated, has moved the gear sales division, which has been located at the company's plant in Buffalo, and the marine sales division, formerly connected with the New York office, to its main offices at Ansonia, Connecticut. According to Carl Hitchcock, vice president in charge of sales, these moves are in line with the company's policy to coordinate and centralize, as

much as possible, various departmental functions.

R. C. Wilson, manager of Buffalo sales, will continue in that capacity with headquarters Ansonia. In addition to Mr. Wilson, Pierce Birkhoff and J. H. Allen of the Buffalo sales staff will be transferred to Ansonia, where they will continue to handle the sale of gears, speed reducing and speed increasing units, and flexible couplings. The sale of gear generating machines and gear cutting tools will continue at Buffalo under the direction of William C. Oberem. John Brandt will remain in the Buffalo territory as sales representative for all F-B products.

The members of the New York sales staff who will also be transferred to Ansonia are Norman L. Shaw, manager of marine sales, William Frayne, Richard F. Marsh, and Elmer F. Myers.

The engineering and manufacturing departments of Farrel-Birmingham will continue to be located at the Buffalo plant. The export sales department will remain in the company's office in the Chrysler Building, and Austin Kuhns, vice president, will also continue his office there.



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#### Chronolog Incorporated Named National Representative for National Acme Chronolog Units

Chronolog Inc., Detroit, Mich., has been appointed as national representative for the new Model C-1 Chronolog now being manufactured by The National Acme Co., 170 E. 131st St., Cleveland 8, Ohio.

An electrically operated unit designed to provide a printed record of machine productivity and idle time, as well as a count of the work produced, the Chronolog, according to T. L. Hutchinson, director of Chronolog Incorporated sales, affords a system of production control that is applicable to a wide variety of plants. Sales and service personnel has been trained which is capable of on-the-ground recommendations for every type of production equipment subject to interruptions.

#### B. C. Ames Company Celebrates Golden Anniversary

The B. C. Ames Co., 29 Ames St., Waltham 54, Mass., manufacturer of micrometer dial indicators and gages, is now celebrating its golden anniversary. Founded by Bliss Charles Ames in Waltham with Mrs. Ames as office manager and one apprentice, the company rapidly expanded as the features of its precision machinery and instruments became known to markets in the United States and abroad.

In 1915, due to the expansion caused by World War I, Mr. Ames took his two sons, Warren and Ira R., into the company and operated the plant until its incorporation in 1922. In 1923, Mr. Ames retired, and he and his wife moved to California. Mrs. Ames died in 1947, and Mr. Ames died the following year.

In 1946, the machine tool division of the company was sold to Ira Ames; and Warren Ames, present president, took over as owner of B. C. Ames Co.

#### New Anti-Friction Bearing Standard

A new 12-page American Standard on "Gaging Practices for Ball and Roller Bearings" has been announced by American Standards Association. It is the first of a series under development by a committee representing 14 associations of engineers, industrial users and manufacturers of bearings, and the U. S. Army and Navy.

In general, the standard specifies

the most acceptable methods of determining whether bearings conform to specified dimensions. Specifically, the standard defines inspection methods, giving gaging loads and methods of measurement. Standard methods are presented for obtaining dimensions of inner and outer rings, parallelism of sides, eccentricity, groove parallelism with sides, and other significant measurements.

Copies of American Standard Gaging Practices for Ball and Roller Bearings, B3.4-1950, may be obtained from the American Standards Association, 70 E. 45 St., New York 17, N. Y., at 50 cents each.

#### Pratt & Whitney Holds Open House

Over 1,000 tool engineers, machine tool experts and manufacturers, representing more than 150 companies in the greater Hartford area, participated in the two-day open house held recently by Pratt & Whitney, Division Niles-Bement-Pond Company, at its large uni-level plant in West Hartford, Connecticut. The event, conceived by Alexander H. d'Arcambal, vice president and general sales manager, fea-





View showing cutting tools and gages being inspected by persons attending
Pratt & Whitney open house

tured a preview of the large cutting tool and gage exhibit and the Keller-flex exhibit which appeared at the 1950 "Cost-Cutting" Exposition of the American Society of Tool Engineers held April 10-14 in Philadelphia.

The highlight of the gage display was the new P&W Beta Ray Gage which incorporates a radio-active isotope to measure the thickness of any moving strip material from steel to paper. Also shown in action was the Syncro Timer, a preset delayed-action automatic control for sorting and distributing from conveyor lines, dispatching systems, and so on. Other precision measuring devices shown included Air-O-Limit Gages which utilize small jets of air, Electrolimit Gages,

P&W Precision Gage Blocks and many conventional types of gages.

A complete line of precision cutting tools was displayed, including carbon steel, high speed steel and carbide tools. The proper application of surface hardening treatments was demonstrated, as well as the importance of grinding finish in connection with the life of cutting tools.

The entire line of Kellerflex machines was also shown, featuring the carbide Di-Bur, a newly designed cutting tool which is said to produce harmless granular chips instead of sharp slivers from tough metals. Highspeed burs were also included in this display.

Guests were given an opportunity to

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examine many of the precision machines manufactured by the company. In the machinery demonstration room some 15 machines were in full operation under typical working conditions. and a graduate of Vanderbilt University, has been added to the welding engineering staff of Lincoln's Tulsa, Oklahoma office.

#### Lincoln Electric Adds to Sales **Engineering Staff**

The Lincoln Electric Co., Cleveland, Ohio, has increased the welding engineering staff of several of its district

offices. J. W. Brooks, a graduate of Cornell University, is now serving in the Boston area as a welding engineer. J. J. Chemerys is handling industrial accounts in the Syracuse territory. Mr. Chemervs is a graduate of Penn State in industrial engineering and was employed by the Joy Manufacturing Company prior to joining Lin-

W. R. Karll has assumed the sales and engineering responsibilities in Lincoln's Newark, New Jersey office. After graduating from Harvard Business School, Mr. Karll was employed by several organizations in selling and as an industrial management consultant. R. G. Todd, a mechanical engineer

#### Pittsburgh Tool Steel Wire Cmpany Acquires Washington Precision Grinding Company

The Pittsburgh Tool Steel Wire Co., Monaca, Pa., has acquired the Washington Precision Grinding Co., Wash-

#### Now, PRECISION CONTROL for ALL Air Operations.. HY-CYCLIC AIR VALVES

EW Hi-Cyclic Air Valves fill the need for a fast, accurate, smooth control for air power. Hi-Cyclic Valves function as ordinary operating valves; control air cylinder stroke to .001"; reciprocate mechanically or electrically; control pressure in both ends of the cylinder; stop and return the stroke at any point without overtravel; control stroke speed in either direction; operate on any airline pressure as well as 1" of vacuum; consume air in direct ratio to work done.

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Bulletin 10 describes Hi-Cyclic Basic Valves; Single and Double Sole-noid Valves; Heavy Duty Piloted Valves; Hydraulic Valves. Write for your free copy.

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ington, Pa., producer of precision ground tool steel flat and square sections. These products complement the line of drill rods and other cold finished fine steel produced by the Pittsburgh Tool Steel Wire Company. The machinery and equipment of Washington Precision Grinding Company have been moved to the main plant at Monaca where operations are being continued.

#### Rice Pump and Machine Forms New Corporation

The Rice Pump and Machine Co., Milwaukee 15, Wis., formerly a division of Milwaukee Chaplet & Manufacturing Company, has recently been established as a separate corporation. R. D. Houghton, formerly division manager, has been elected president and treasurer of the new corporation. Erwin Losse, formerly superintendent of the Rice Pump Division, is secretary,

while Robert G. Rice, president of Milwaukee Chaplet, is vice president. Mr. Houghton will serve as general mana-

ger and sales manager of the Rice Pump and Machine Company and Mr. Losse will be in charge of manufacturing, engineering and product development.

The new corporation will continue the manufacture of the Milwaukee die filer



R. D. Houghton

and Milwaukee profile grinder for tool and die shops, and Milwaukee sprue cutters for non-ferrous foundries, in addition to Rice centrifugal pumps, in a complete range of sizes and models. The office and manufacturing operations will be continued at the present address.

#### R-M Moves Marketing and Merchandising Department

J. F. D. Rohrbach, president of Raybestos-Manhattan, Inc., has announced that the Department of Marketing and Merchandising has been moved to the corporation's executive headquarters at 61 Willett St., Passaic, N. J. According to Mr. Rohrbach, this move effects a closer working arrangement with corporation officials and a desirable ex-



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pansion of activities under the continued supervision of Franklin A. Miller as marketing and merchandising director and J. W. Brush, Jr., assistant.

#### To Head Mid-West Coated Abrasive Manufacturing

Directors of the Mid-West Abrasive Co., Owosso, Mich., have elected Daniel Wardlaw, a veteran employe to a vice presidency in charge of coated abrasive manufacturing. Mr. Wardlaw, who

began with the company in 1931, is said to have a national reputation as an authority on the manufacture of sandpaper products. For several years Mr. Wardlaw has been in charge of sandpaper manufacture for Mid-West without being an officer of the corporation.

All other officers of the company have been reelected and are as follows: James T. Jackson, president and general manager; L. P. Jackson, vice president charge of engr; R. A. McElhinney. vice president in charge of solid abrasive mfg; Saunders P. Jones, vice president in charge of sales: William E. Essery, treasurer; and A. C. Reppenhagen, sec.

#### Did You Know?---

John Hassall, Inc., Brooklyn, N. Y., manufacturer of special nails, rivets and screws, has announced the election of William W. Smith, Jr., to the newly created position of executive vice president and secretary of the company.

-- 0 ---

Albert E. Zeisel, formerly vice president and general sales manager of Eutectic Welding Alloys Corp., New York City, has announced that he is no longer with that company.

#### HEADQUARTERS FOR BLOW GUNS

Drop Forgad Stainless Steel for hard use and long life. Comfortable grip; protected, countersunk nose; hang-up hook; shielded button; practically indestructible.

Lever type forged brass. Controllable air flow type—zephyr to a blast.

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**Heavy Duty Blow Gun.** Brass body with steel nose. Has double or more the air capacity of guns above.

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#### A. SCHRADER'S SON

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Division of Scovill Manufacturing Company, Incorporated



Robert S. Cave has been named general sales manager of Severance Tool Industries, Inc., Saginaw, Mich, manufacturer of midget mills, chatterless countersinks, and other cutting tools.

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At the annual meeting of the stockholders of the Wagner Electric Corporation, A. H. Timmerman announced his retirement from his duties as vice president and director. G. A. Waters, vice president in charge of manufacturing, was elected director to succeed Mr. Timmerman.

The Balmar Corp., Baltimore, Md., which purchased the N. A. Strand Co., Chicago, Ill., last year, has announced that the plant will remain in Chicago and will be known as the N. A. Strand Division of The Balmar Corporation. The division will continue to manufacture flexible shafts and flexible shaft machines.

P. B. Postlethwaite, president of the Wagner Electric Corporation and chairman of the executive committee for the past 24 years, has been elected to the newly created office of chairman of the

board. Mr. Postlethwaite will continue as chairman of the executive committee. J. H. Devor, vice president since 1941, has been elected president: H. N. Felton, manager of the St. Louis sales branch, has been elected vice president in charge of sales; and L. W. Mc-Bride, credit manager, has been elected assistant secretary - treasurer to succeed A. K. Bahret, who retired.

W. L. Russell has been selected by Tamms Industries, Inc., Chicago, to be its representative in the New Orleans area. Mr. Russell will serve the paint, feed, sanitary, janitor supply and other fields covered by the company's products.

Louis F. Weyand, vice president in charge of the Minnesota Mining & Manufacturing Company's adhesives and coatings divisions, has been elected to the firm's board of directors.

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# Here's your quide to lower metal forming costs on smaller jobs



#### VERSON ALLSTEEL PRESS CO.

9310 S. Kenwood Ave. CHICAGO 19, ILLINOIS Holmes St. and Ledbetter Dr. DALLAS 8, TEXAS

THERE'S A VERSON PRESS BRAKE FOR EVERY JOB FROM 15 TONS UP!

L. J. Wing Manufacturing Company, manufacturer of heating, ventilating and combustion equipment and steam turbines, with three separate factories in Newark, N. J., and with general offices in New York City, has consolidated all offices and factories in a single modern building at Vreeland Mills Road and Fernwood Terrace, Linden, N. J. A sales office will be maintained at 154 W. 14th St., New York City.

Carboloy Co., Inc., 11143 E. 8 Mile Ave., Detroit 32, Mich., has announced the appointment of Tools & Supplies, Inc., 3131 Olive St., St. Louis 3, Mo., as an authorized distributor for Carboloy standard tools, standard blanks, carbide-tipped masonry drills, and diamond impregnated carbide wheel dressers in the St. Louis area.

Milton K. Grey, former vice president in charge of sales for the Hill-Shaw Company, Chicago, has joined the Benchmaster Manufacturing Co., Los Angeles, as director of sales and advertising.

Diamond Tool Company, formerly located at 938 E. 41st. St., Chicago 15, Ill., has moved its executive main office and factory to 246 Broadway, South Haven, Michigan.

The appointment of Karl Kesselring as general factory manager and Gordon G. Lohmiller as planning manager has been announced by SKF Industries, Inc., Philadelphia. Mr. Kesselring succeeds John Lawrence, recently named technical vice president, while Mr. Lohmiller assumes planning duties that were held by Mr. Kesselring.

Edward A. Lynch Machinery Company, distributor for machine tool and metal working machinery builders, has moved its offices from the Times Medical Bldg., Ardmore, Pa., to larger quarters at 29 E. Wynnewood Rd., Wynnewood, Pa., a a suburb of Philadelphia.

Anthony J. Potts has been appointed Chicago district manager of Selas Corporation of America, heat processing engineers, and will maintain headquarters at 3857 W. Washington Boulevard.

The Mine & Smelter Supply Co., 1422 17th St., Denver, Colo., has been appointed exclusive representative for Hydro-Line air and hydraulic cylinders in the Denver and El Paso territory.



The appointment of Charles Lukens Huston, Jr., president of Lukens Steel Co., Coatesville, Pa., to the board of trustees of Drexel Institute of Technology, Philadelphia, has been announced by Dr. James Cresse, president of the institute. - 0

Wilfred R. Ogg has been appointed sales representative for northern New England by the grinding machine division of Norton Co., Worcester, Mass. Howard P. Chace succeeds Mr. Ogg as head of the sales engineering department.

The appointment of Harry W. Henn, 4621 Hamilton Ave., Cincinnati 25, Ohio, as exclusive sales representative for the Porter Precision Products Co., Cincinnati, Ohio, and the Reltool Corp., Milwaukee, Wis., has been announced. With this appointment, Mr. Henn's services are now rounded out to include precision made interchangeable button head piercing punches and a complete line of high speed steel metal cutting tools.

David P. Reynolds, vice president and manager of the General Sales Division, Reynolds Metal Co., Louisville, Ky., has

announced appointments i n the company's aluminum division. F. F. Tiffany, formerly district manager of the Dayton, Ohio office, has assumed the duties of division manager in the Pittsburgh area, with headquarters in the company's Pittsburgh field office. T. D. Lewis is now division manager located in the Atlanta, Georgia office.

- 0 -Kennametal Inc., Latrobe, Pa., manufacturer cemented carbides and cutting tools, has announced the appointment of John D. Cook as a representative the north Indiana area. Other additions to the company's service personnel include William J. Bruun and Harry E. Brandvik, Chicago office; and Edward J. Novack, Philadelphia Office. Stenzel & Co., 25 Richard Wagner St., Weisbaden. Germany. has been appointed the Kennametal representative for Western Germany.



4073 MT BB

The New Britain-Gridley Division of The New Britain Machine Company, Connecticut machine tool builder, has announced the addition of Gus Gran to its Detroit office. Mr. Gran is well known to Detroit industry, having been with Colonial Broach for the past 16 years.

C. H. Buckmaster, 43, district manager for The Lincoln Electric Company in Detroit, Michigan, died recently as a result of injuries received in an automobile accident. Mr. Buckmaster had been in the company's sales department for 20 years.

Thomas L. Coatney has been appointed general sales manager in charge of all sales operations for The Frederick Post Co., Chicago 90. Ill., manufacturer of sensitized reproduction materials, engineering supplies and equipment.

The **Hyster Co.**, Portland, Ore., Peoria and Danville, Ill., has taken over the manufacture and sale of turret trucks formerly produced by the Salsbury Corp., Los Angeles, Calif., according to an announcement by Ernest G. Swigert, president of the organization.

At the annual meeting of the board of directors of the Roto-Finish Co., Kalamazoo, Mich., C. Heamon Castle was elected to the position of vice president. Officers of the company are D. T. Barrett, president and treasurer; C. H. Castle, vice president and technical director; and J. W. Servaas, vice president and secretary.

David E. Davidson was elected vice president for sales at a recent meeting of the board of directors of the Link-Belt Co., Chicago I, Ill. Mr. Davidson's head-quarters will be at the executive offices in Chicago. Eugene P. Berg, formerly assistant general manager, has been appointed general manager of the Pershing Road plant, to succeed Mr. Davidson.

Arthur Templeton has been appointed to the sales engineering staff of Templeton, Kenly & Co., Chicago, Ill., manufacturer of mechanical and hydraulic jacks. Mr. Templeton will cover the Chicago territory.

F. Edward Mardorf, president of The Elson Abrasive Corp., 2640 Carnegie Ave., Cleveland, Ohio, has announced the development of the "Elsonized Process" for refinishing worn abrasive discs.



Quality Handling & Storage

Equipment

Alphonse O. Rousseau, formerly abrasive products safety engineer at the Norton Co., Worcester, Mass., died recently at the age of 61 after a brief illness. Mr. Rousseau was a member of the Norton Company for 43 years.

- 0 --

The appointment of Eugene G. Sheasby as assistant district manager for the Pittsburgh district of United States Steel Supply Company, subsidiary of United States Steel, has been announced by K. P. Rindfleisch, district manager.

George H. Davis has joined the Iron and Non-Ferrous Casting Section of the Development and Research Division of The International Nickel Co., Inc., 67 Wall St., New York 5, N. Y. Mr. Davis will be concerned principally with Ni-Hard developments, working out of the New York office.

- 0 -

Announcement has been made by Harnischfeger Corp., Milwaukee, Wis., of the appointment of A. C. Hendrickson as assistant sales manager of the P & H Welding Division, manufacturer of a.c. and d.c. arc welders and welding electrodes.

For quick, accurate, on-the-spot hardness testing, reading directly in the Rockwell scales.

#### HARDNESS TESTER

Flat and round bars, sheets, tubing and wire are tested on the spot without cutting off specimens. Punches, dies, cutters, saws and odd-shaped pieces are tested before and after heat treating. Used by metallurgists, inspectors and heat-treaters. Sizes for work 1" to 6" round and flat. Send for circular.

Comes complete with anvils, penetrators, test blocks and carrying case.

#### AMES PRECISION MACHINE WORKS Makers of Precision Bench Lathes & Milling Machines

WALTHAM 54, MASSACHUSETTS

Bell Equipment Co., 5212 Santa Fe Ave., Los Angeles 58, Calif., has been appointed exclusive national distributor of the "Waltco" quick-opening and closing collet attachment with 1-inch collet capacity for 1%-in ch hole-inspindle lathes.

The Federal Machine & Welder Co., Warren, Ohio, has announced the appointment of the Austin - Hastings Co., Inc., Cam bridge, Mass., as district representative for the states of Maine, Vermont, Massachusetts, Rhode Island. New Hampshire. and Connecticut.

Oilmen's Service and Supply Co., 967 Commonwealth Ave., Boston 15, Mass., is now exclusive distributor for Stow truck pump drive equipment in the New England area, according to J. L. Dickinson, vice president, Stow Mfg. Co., Binghamton, New York.

The appointment of Richard A. Biggs as director of architectural development for the Crucible Steel Company of America, New York City, manufacturer of stainless steel sheet, strip, bars, and tubing, has been announced by J. D. Glenn, general manager of stainless steel sales.

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The appointment of William C. Etheredge as general staff manager, general sales department of the United States

Steel Supply Company, Chicago, has been announced by M. J. Aurelius, sales vice president of the warehousing subsidiary of United States Steel. Mr. Etheredge succeeds Eugene G. Sheasby who has been named assistant district manager for the company's Pittsburgh house.

- 0 --

Vas L. Howe has been appointed advertising manager Niles-Bement-Pond Company, including the Pratt & Whitney Division, Chandler-Evans Division, and Potter & Johnston Company, Pawtucket. subsidiary. Fred J. Dunne has been appointed to the newly created position of assistant advertising manager.

- 0 -

Carboloy Co., Inc., 11143 E. 8 Mile Ave., Detroit 32, Mich., has announced the appointment of the Erie Mfg. & Supply Corp., 1215 Peach St., Erie, Pa., as an authorized distributor of Carboloy standard tools, standard

blanks, carbide-tipped masonry drills, and diamond impregnated carbide wheel dressers for Erie and the northwestern Pennsylvania territory.

-0-

The appointment of H. F. Hagenauer to purchasing agent has been announced by Fred O. Burkholder, president of Ahlberg Bearing Co., Chicago. Ill., manufacturer of ball and roller bearings, pillow blocks, and machine parts. Mr. Hagenauer succeeds the late P. F. McGuinn, who formerly served as vice president and purchasing agent.



Hugh W. Vogl, president of the Wilton Tool Mfg. Co., Chicago, Ill., has announced the appointment of Lawrence M. Rich as vice president in charge of sales. Mr. Rich will direct sales, advertising and sales promotion for Wilton, manufacturer of vises and other tools for metal-working industries.

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J. Allison, formerly of A. C. Geldner & Company, has been appointed sales representative for the states of Oregon and Washington by Titan Metal Mfg. Co., Bellefonte, Pa., manufacturer of brass and bronze rods, extruded shapes, forgings, and die castings.

0

E. W. Bliss Company has announced the appointment of the Steel City Tool & Machinery Co., Inc., 1014 Plaza Bldg., Pittsburgh 19, Pa., as sales representative for Bliss mechanical and hydraulic presses in portions of western Pennsylvania and southeastern Ohio.

At a board of directors meeting of Fairbanks, Morse & Company, Chicago, O. O. Lewis was appointed vice president in charge of sales and F. J. Heaslip was appointed vice president in charge of purchases and traffic.

-0-

Appointment of James L. Snaman as general sales manager for The Pannier Corp., Pittsburgh, Pa., has been announced by Ralph A. Pannier, president of the company. Mr. Snaman will direct the sales of the complete Pannier line of marking machines, steel and rubber dies and stamps, embossing equipment, stencils and industrial marking inks.

-0-

The Riverside Metal Co., Riverside, N. J., has appointed George W. Spanberg manager of its Chicago sales office at 549 W. Washington Blvd. Mr. Spanberg succeeds the late Charles Sumner. At the same time, James T. Duffy III has been named assistant manager in the Chicago office.

#### **ATF Features Cartoon-Style Incentive Posters**

A CONTINUING drive in the plants of the ATF Incorporated group of companies to tighten production, cost and quality standards, has enlisted the aid of a new character named Wastie, central figure in a series of cartoon-style incentive posters.

Wastie eats money and loves oil-slick, accident causing floors. He dotes on slipshod methods that make the scrap pile grow, and he is passionately fond of the lazy and forgetful. Wastie is a bum.

Sample sets of the posters for reproduction and use by other companies in their plants are available on request to ATF Incorporated, human relations department, 200 Elmora Ave., Elizabeth B, New Jersey.



#### Book Reviews

Industrial Inspection Methods. Revised Edition. By Leno C. Michelon. Published by Harper & Bros., 49 E. 33rd St., New York 16, N. Y. 568 pages. Illustrated. Cloth binding, board covers. Price, \$6.00.

Completely revised and reset and half again as long as the original text, this book provides a comprehensive and scientific presentation of the principles and current practices in industrial inspection work, covering all major aspects of precision measurements as they are employed at the present time. The major divisions of the book are concerned with basic concepts, dimensional control, testing for physical and mechanical properties, surface inspection, and inspection organization and personnel.

The various precision and non-precision tools used in inspection work are described fully and their correct use is illustrated. Rules, micrometers, verniers, gages, dial indicators, comparators, optical measuring devices, automatic gages, and so on, are fully covered. Extended treatment is given to statistical quality

control methods, modern destructive and non-destructive tests for physical and mechanical properties, modern techniques in surface measurement, and other similar topics. All pertinent tables and charts are included, as well as a complete list of bibliographical and visual aids. Problems and questions for study are also provided for each chapter of the text.

Standard Management Practice Series. Carl Heyel, general editor. Published by National Foremen's Institute, Inc., New London, Conn. Twelve volumes consisting of four groups of three books each. Price per volume. \$2.50.

per volume, \$2.50.

Designed to cover various phases of good foremanship, this series of books consists of four groups with each group divided into Books I, II, and III. Each Book I deals with some phase of human relations and leadership; each Book II covers an aspect of manpower-utilization; while each Book III is concerned with some technical operating problem. The foreman can, therefore, read any group



and acquire a horizontal picture of selected parts of his job; or, by reading all books of a particular group, he can acquire a vertical picture of a specific portion of his job. However, no book or group independent upon any other; they merely

supplement each other.

With three exceptions, the books are written in two sections, each by a different author. The opening section presents the broad picture of the subject. The second section is written by a factory operating executive who shows the reader how he can best effect the principles discussed in the first section. The "Series"

Real Spring Winder!

Winder offers the ideal means of winding extension, compression, torsion, taper, double taper, or left hand springs. Try one in your shop. You'll like it and the price is reasonable.

No. 1 Capacity 0 thru 3/32' wire \$1.50
No. 2 Capacity 0 thru 3/16" wire \$5.00
No. 3 Capacity 0 thru 5/16" wire \$5.00

HJORTH LATHE & TOOL CO.

10 BEACON STREET

Will earn its cost in one day. The Hjorth Perfection Spring Winder offers the

WOBURN, MASS.

is being published by groups. Group One is now available; Groups Two, Three, and Four will be released at approximately three-month intervals.

Best's Safety Directory for 1950-1951. Third Edition. Published by Alfred M. Best Co., 75 Fulton St., New York 7, N. Y. 511 pages. Illustrated. Cloth binding, gold embossed board covers. Price, \$5.00.

This book is said to combine all practical features of a safety manual, directory, index, encyclopedia, and catalog into one comprehensive volume illustrating and explaining what safety products or devices to use for specific hazards, how to use them, and where to obtain them. One of the outstanding features of the book is an indexing and subject-grouping system which enables safety products to be located even when the user is not certain of the type or name of the product he needs. The logical arrangement of subjects also serves as a check list of hazards, many of which are frequently overlooked.

The various chapters comprising the book include information on protective clothing, fire and burglary protection, first aid and sanitation, plant maintenance and sanitation, above-ground protection, warning and material handling equipment, machinery guarding and control, lighting and electrical equipment, atmosphere control, and training and working aids.

Fundamentals in the Production and Design of Castings. By Clarence T. Marek. Published by John Wiley & Sons, Inc., 440 4th Ave., New York 16, N. Y. 383 pages. Illustrated. Cloth binding.

board covers. Price, \$4.00. Intended to provide background in-





formation for engineers, this book has as its principal objective that of correlating casting design with economical casting production. The techniques, skills, and practices in casting production are presented to afford the reader a sound background in the production and design of castings. Important features of the book include an overall view of the casting industry; a description of basic molding processes; the theory of clay bond; a background in the principles of metallurgy; a description of high-voltage x-ray and supersonic inspection; modern theories on the melting of cast metals; and a description of the present-day production method.

On the Beam. By Arthur O. England. Published by National Foremen's Institute, Inc., New London, Conn. 30 pages, 4<sup>1</sup>/<sub>5</sub> x 6<sup>3</sup>/<sub>4</sub> inches. Illustrated. Laminated cover. Price 25 cents (less in quantity).

This booklet is designed to emphasize the importance of planning your work and presents rules and principles which apply to all types of jobs. Opening with a definition of "planning," the booklet then sets forth six steps in planning and four factors to be considered when planning. It concludes with a discussion of seven benefits to be gained through proper work planning, including cutting bottlenecks, controlling quality, relieving fatigue, and other benefits.

Industrial Materials Handling. Original author, Curtis H. Barker, Jr. Revised and rewritten by Irving M. Footlik, Charles F. Yarham, and J. Francis Carle. Published by Lincoln Extension Institute, Inc., 1401 W. 75th St., Cleveland 2, Ohio. Illustrated. Price, \$4.75.

The prime purpose of this book is to establish a basic philosophy for thinking and acting objectively in effective savings of money, time and effort in the industrial handling processes by the application of the new analyses, equipment, and procedures to existing needs. The book can be used as a materials handling handbook by executives. It provides a training medium and reference for industrial personnel, plant engineers, plant and works managers, superintendents, supervisors, traffic managers, college students,

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and so on, and also provides an excellent training tool for college instructors and

industrial training directors.

The contents of the book are divided into 15 chapters headed as follows: Development and Scope of Materials Handling; Fundamentals of Materials Handling Operations; Selection of Materials Handling Equipment; Handling Equipment—Floor Operated; Handling Equipment-Miscellaneous; Conveyors; Overhead Handling Equipment; Power Industrial Trucks; The Ford Truck; Pallets and The Pallet System; Unit Loads; Plant

Layout; How to Make a Materials Handling Analysis; A Typical Industrial Solution; and Materials Handling Organization.

Selling to the Government. Published by Chamber of Commerce of the United States, Washington, D. C. 64 pages. Price, 50 cents.

This guidebook is designed to simplify many of the problems of businessmen who

want to sell to the federal government. It explains procurement operations and lists agencies which make major purchases. The businessman is told how he can learn which agency commonly buys items that he produces. where and how they are bought and what kind of purchases are currently being made. The guidebook explains how to obtain the spot information made available by government agencies and by private publishers and how to make the best use of the information in business planning.

In a section called "What to Do," the guidebook explains how a businessman can be put on lists of bidders to receive invitations - to - bid; what the government will want to know about the company's products, facilities and resources; and factors the businessman should consider before preparing a bid. Appendices list government and private sources of



sity of counting or making any calculations. Indispensable in milling taps, reamers, small gears, sprocket wheels, special grooving, etc. Described in Eulletin No. 124.

Kempsmith Standard Attachments broaden the scope of your milling machine . . . lower capital investment . . . save in set-up time.

KEMPSMITH MACHINE CO. 1835 SOUTH 71st STREET MILWAUKEE 14, WIS., U.S.A.

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in all popular

sizes or types. Adaptable to ANY make of

milling ma-

chine with

standardized

spindle.

additional information on "who buys what," specifications and principal procurement laws and regulations.

Welding Handbook. Third Edition. Published by American Welding Society, 33 W. 39th St., New York 18, N. Y. 1651 pages. Illustrated. Cloth binding, board covers. Price, \$12.00.

This book is intended primarily to serve as a source of information for engineers in the design, fabrication and inspection of welded construction but should prove useful to anyone seeking information on welding. The text is sufficiently extensive to make the volume useful as an engineering texbook. The book contains information on welding in all its aspects, based on recognized practices in industry at the time of its issuance. The individual chapters are arranged in groups, principally by processes, materials and applications.

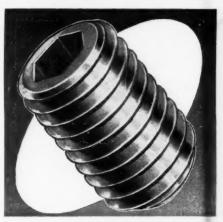
Chapters in the book cover fundamentals of welding; gas welding processes; arc welding processes; resistance welding processes; miscellaneous welding processes; cutting processes; metals; design and cost considerations; inspection and quality control; applications; and A.W.S. standards. Engineering tables are included.



We Called in Is a Bit Nearsighted.

## Quality....

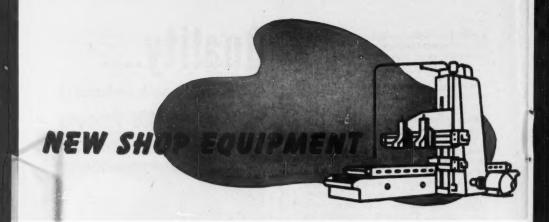
Everybody talks about it B-RIGHT-ON NU-Process . . . really assures it!



New methods, incorporating an entirely new metal-working process, make unvarying top quality a fact, not just a claim with Brighton Socket Screw products. Specially selected alloy steel, meeting Brighton's rigid specifications, is formed by Brighton's Nu-Process into screws with continuous unbroken fibers and fine compact grain. Carefully heat-treated under electronic control every screw has the exact hardness and strength needed.

For full details on Brighton Screws, send for your copy of New Catalog.

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#### **Automatic Shaft Machine**

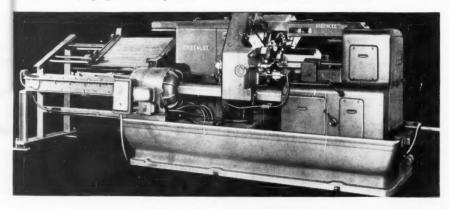
Greenlee Bros. & Co., 1882 Mason Ave., Rockford, Ill., has completed a 15%-inch 6-spindle screw machine adapted for handling precut bar and tubular stock in lengths of from 30 to 60 inches. The machine has provisions which permit a turning operation on the back end of the stock, thereby eliminating a second operation.

The stock is loaded into a magazine at the rear of the machine. This magazine is adjustable for stock of various lengths, and holds up to 40 bars of ¾-inch diameter material. An air cylinder, operating a loading bar, advances the stock into the spindles, where it is accurately positioned by a swing-type stock stop that is automatically cleared from the tooling area after the loading cycle is completed.

At the same time that a new bar is loaded into the spindle, the completed piece is moved forward into a live-roll mechanism which propells it through a sleeve in the gearbox and out through the front of the machine. An out-feed hopper (not shown) neatly stacks the bars and makes them readily available for further processing.

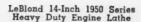
#### Heavy Duty Engine Lathe

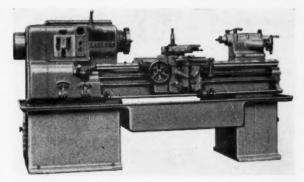
A 1950 Series heavy duty engine lathe announced by The R. K. LeBlond Machine Tool Co., Cincinnati 8, Ohio is available in 12, 14, and 16-inch swing sizes with 24 spindle speeds, and a 20-inch size with 32 spindle speeds. A maximum speed of 1,250 r.p.m. is said to be attained in the 12 and 14-inch sizes.



Greenlee Automatic Shaft Machine

276





The 1950 Series lathe is arranged for higher powered motors than previous models. The 12 and 14-inch sizes each use a 7½ h.p. 1,800 r.p.m. motor; the 16-inch size, a 10 or 15 h.p. 1,800 r.p.m. motor; and the 20-inch size, a 15 or 20 h.p. 1,200 r.p.m. motor. An enclosed automatically lubricated quick-change gearbox included in the design of the lathe provides 60 feed and thread changes through the use of hardened alloy steel gears. The gear shafts are supported on anti-friction bearings.

The LeBlond compensating V-way principle has been retained on the bed, which is fitted with replaceable hardened and ground steel ways front and rear. The patented LeBlond apron and tailstock have also been retained. The apron is of one-piece construction with positive jaw feed clutch and single lever length and cross-feed control. The tailstock is of the offset thrust-lock type.

The LeBlond line of heavy duty engine lathes also includes four larger sizes—25, 32, 40, and 50-inch—all of which are said

to conform to the same basic design as the lathe illustrated herewith.

> Drawing Compound

Designated as Houghto-Draw 357, a drawing compound for use in the cold drawing of hot or cold

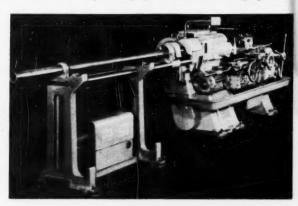
Jones & Lamson Ram Type Universal Turret Lathe Equipped with Hydraulic Bar Feed and Collet Chuck Mechanism rolled bars or rods has been announced by E. F. Houghton & Co., 303 W. Lehigh Ave., Philadelphia 33, Pa. The compound is a heavy paste containing high melting point waxes and fats combined with a colloidal pigment and has high adhesive properties.

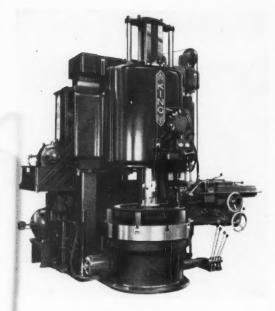
Houghto-Draw 357 is applied by immersion of the work in a tank con-

taining a solution of the compound (5 ounces to one gallon of water) maintained at 170 deg. F. The work may be drawn as soon as it is dry or can be stored for a reasonable time without deterioration of the coating. The film can be removed by degreasing or by use of a medium alkaline cleaner. Bars drawn with the compound are said to have a bright and a smooth surface.

#### Hydraulic Bar Feed and Collet Chuck Mechanism

Designed to provide for continuous operation at high production rates without exhausting the operator, a hydraulic bar feed and collet chuck mechanism for Jones & Lamson universal turret lathes has been announced by the Jones & Lamson Machine Co., Dept. 710, Springfield, Vt. The mechanism allows for single-lever finger-tip control of the complete operating cycle, thus conserving operator





utilizes a square type construction which permits accurate alignment and easy adjustment

by four large gibs.

The cycle of the ram is fully automatic and can be set to rapid traverse to the work, rough bore at one feed, finish bore at another feed, form a radius at another feed, then dwell and rapid traverse out of the work. A special motor operated power chuck holds the wheel securely and allows for fast loading and unloading.

The separate hydraulic power unit for actuating the boring head is located on the side of the machine. An oversized side head assembly permits full use of the carbide tooling even while extended to machine the

hub details.

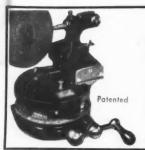
energy with a resultant increase in his production. The mechanism can be installed on any Jones & Lamson No. 3, 4, 5, 7, or 8 universal turret, at the factory or in the field.

#### Diesel Wheel Boring Machine

The King Machine Tool Division of American Steel Foundries, Cincinnati 29, Ohio, has announced the development of a special Diesel wheel boring and facing machine. Unusual rigidity has been provided by the use of a massive fixed rail which carries the oversized boring ram and hydraulic feed cylinders. The ram

#### Twin Mill

For small parts milling, the Nichols-Morris Corp., 50-H Church St., New York 7. N. Y., has announced the Nichols Twin Mill which is designed to mill two or more surfaces simultaneously, yet requires only one fixture and one operator. Primarily intended for automatic, light, high-speed milling operations on all machinable materials the machine employs two independently geared head milling units which are mounted opposite each other on knee and saddle assemblies of conventional design. The machine table reciprocates automatically between the milling heads, each of which is V-belt driven by its own 1 h.p. pancake type motor, providing a selection of 15 spindle



#### Now! THE AUTOMATIC ANGLE TANGENT TO RADIUS DRESSER

That Eliminates Breaks in Profile at Points of Tangency. NO TEMPLATES OR CRUSHER ROLLS REQUIRED!

The Jeon Dresser will dress a radius either concave or convex, with angles absolutely tangent on either or both sides of the arc, IN ONE CONTINUOUS OPERATION. Also, any combination of angles or arcs. Write for Price and Folder. Dealers' Inquiries Invited

JEDN MANUFACTURING COMPANY Post Office Box 6750 Washington 20, D. C.



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For better inspection, better production, make all micrometer readings with Starrett Satin Cbrome Micrometers. Satin Cbrome Finish means no squinting, no shifting to better light. Because markings always stand out sharp, clear and easy to read, all measurements can be made faster, easier, more accurately. And for lasting accuracy, there's the added advantage of high resistance to stains and corrosion. Insist on STARRETT Satin Cbrome Micrometers — inside, outside or depth gages. Get the big advantage of Satin Cbrome see-ability along with all-important Starrett accuracy and Starrett superior features.



# STARRETT No. 231 Solin Chrome Wisrometer 1" Capacity, Topared Frame, Sycanore Case STARRETT No. 440 & No. 443 Setin Chrome Misrometer Daph Gages One of a Complete Rong With 2½, 3, 4 or 5 inch bases STARRETT No. 823 Takutar Rode Solid Reds Sotin Chrome Inside Micrometers Hardened and Graund Contact Surfaces, Capacities up to 37 inches

OC STRADE MARK	
STANDARD OF PRECISION	RESERVE YOUR FREE COPY NOW  THE L. S. STARRETT CO., Athal, Mass. Dept. MD  Please rush my free copy STARRETT NEW TOOLS BOOKLET describing the many new Starrett Tools.
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speeds in geometric progression; lower speeds are secured through gearing and higher speeds through direct belt drive.

The five-step motor pulley engages with a matched pulley that can be mounted on either the spindle shaft or the transmission gearshift. When the driven pulley is mounted on the spindle shaft for direct drive, the gear transmission is disengaged, and five speeds from 700 through 2,050 r.p.m. may be obtained. By changing the driven pulley from the spindle shaft, ten additional geared speeds from 55 to 590 r.p.m. may be obtained.

The saddles carrying the milling heads

have micrometer screw feed traverse adjustments, and the knees supporting the saddle and head assemblies have micrometer screw feed vertical adjustments controlled by convenient hand crank. Thus, either head may be independently and instantaneously adjusted up or down, in or out, to accommodate a variety of work.

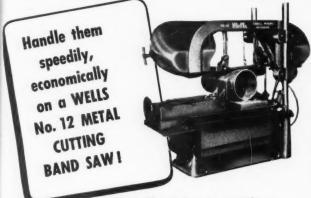
The milling heads may also be offset in the horizontal plane via T slots provided for the purpose. For additional flexibility of the head adjustments, either both heads may adapt a sturdy rightor angle milling attachment in the

attachment in the spindle nose to convert from horizontal to vertical milling. The spindle of this vertical attachment has the same No. 40 milling machine taper as the milling head spindle, thus permitting the use of the same tools.

The machine table is arranged for automatic operation and is powered by an air-hydraulic system providing rapid approach to cutting position, infinitely variable hydraulically controlled cutting feed, and rapid transverse to starting position. When work must be indexed between cuts, provision can be made at the factory for automatic repetition of the table feed cycle and automatic indexing of the workpiece.

The automatic table drive is pneumatic, solenoid-controlled, with suitable trips and limit switches to govern the table's movement, A standard air-motor furnishes ample power to drive the table for all work

## **BIG JOBS** or little jobs



The Wells No. 12 Saw is a sturdy production tool for fast and accurate cutting at a minimum cost. It doesn't require an expert to operate this machine. Just place the stock in the quick-acting vise and push the starting buttons—the hydraulic head descends automatically, feeding the blade into the stock at a uniform rate, governed by electrically controlled, adjustable blade pressure. At the completion of the cut the head returns to a predetermined raised position and the motors shut off.

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#### METAL CUTTING BAND SAWS

WELLS MANUFACTURING CORPORATION 808 TYLER ST. - THREE RIVERS, MICH.

of less than .0005"!

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Die built by the Sherman Tool & Die Co., Charlestown, Massachusetts, for the Signal Manufacturing Co., Lynn, Massachusetts, in a Special Danly Precision Die Sett Danly precision makes every Danly Die Set a reliable base for the finest die work. They save time in the die shop because they are square and true . . . they assure longer production runs in the press because precision closure protects die components.

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DANLY MACHINE SPECIALTIES, INC. 2100 South 52nd Avenue Chicago 50, Illinois



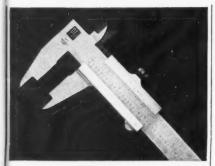
DANLY



#### CARBIDE ROTARY CUTTERS -MACHINE GROUND

For filing, grinding and finishing, burring, countersinking and chamfering, light milling, profiling, tool, die and mold machining. Ford carbide cutters will do a better job in less time at a lower cost-and without a major capital investment. Send for Bulletin C-549-Sizes and Specifications.

MFG. CO. INC.



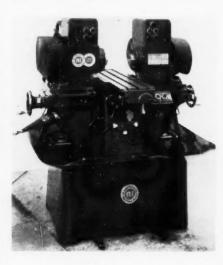
#### Universal VERNIER CALIPER FOR INSIDE, OUTSIDE AND DEPTH MEASUREMENT

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401 Broadway, PTI, Incorporated, New York 12, N. Y.

within the machine's range. Cutting speed is infinitely variable, controlled and stabilized by a hydraulic cylinder with check valve.

The air cylinder operates on air pressures from 75 to 175 p.s.i., and has up to 14% inches of travel. The hydraulic cylinder has up to 11% inches of travel, which is the maximum cutting stroke. With this combination, a cycle can be set to provide rapid advance from loading position to the cutters, slow cutting feed and rapid return to loading position. The speed of the rapid advance and return is



Nichols Twin Miller

adjusted by varying the rate of escape from the air cylinder. The cutting feed is controlled by regulating the valve on the hydraulic cylinder by means of a graduated knob which is conveniently mounted beneath the operating switch box of the table.

A complete push-button control system is mounted on each milling head for ease of operation, with full provision for operation of each milling head independently or in unison, forward or reverse. Likewise, a push-button control is mounted on one of the heads for the coolant system when furnished. Master stop buttons are located at both control stations. The start and emergency stop buttons for the table are conveniently located beside it and just beneath them is a graduated knob for adjusting the rate of the table feed.



## The Logical First Milling Machine

When you decide to buy your first Milling Machine, make it a Sheldon. This moderate price machine tool can be bought as a basic machine ... power feeds, universal heads, etc. can then be added as needed.

Sheldon Milling Machines are rigidly built for continuous, precision service. The spindle is supported in double row Timken Taper Roller Bearings. Fully enclosed variable drive, spindle range 100 to 1100 r.p.m. (with back gear attachment speeds from 25 r.p.m., up). Tapered gibs throughout.

Write for complete Catalog which includes specifications and attachments

Available Accessories and Attachments

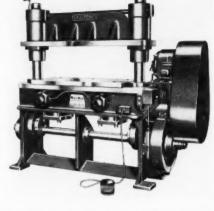
Power Feed Universal Head Dividing Head Coolant System Rotary Table Swivel Vise Drip Pot Oiler HELDON

SHELDON MACHINE CO., Inc. 4250 N. KNOX AVENUE CHICAGO 41, ILLINOIS, U.S.A.

#### Double Crank Punch Press

Manufactured by the Diamond Machine Tool Co., 3429 E. Olympic Blvd., Los Angeles 23, Calif., the Diamond Model 3036 "Multi-Max" Punch Press shown herewith is rated at only 30 tons capacity yet combines a large bolster area of 16 x 36 inches and a ram area of 10 x 36 inches. Due to the large bolster area, together with the speed of the press, which is 80 strokes per minute, a wide variety of metal stamping operations can be economically performed.

The illustration shows the press equipped with two 8-inch pneumatic draw die



Diamond Model 3036 "Multi-Max" Punch Press



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Most modern Nibbler for Template Cutting, Tool Rooms, Shipbuilding, Aircraft Parts, Aircraft Tubing, Sheet & Plate Shops.

GRAY MACHINE CO.
Box 596, Philadelphia, Pa.

cushions and an electrically-operated solenoid clutch mechanism with hand-operated dual push-button safety switches and remote control foot switch. The press is of all-steel welded construction with 4-point engaging clutch. The standard stroke is 2 inches, and the maximum stroke to order is 4 inches. The ram adjustment is 2 inches. The press is single geared with precision herringbone gear design. The crankshaft is 3 inches in diameter and is heat treated, ground and highly polished. The motor required is 3 h.p., 1,800 r.p.m. The standard shut die height is 10 inches, with maximum to order 24 inches.

#### DIE CASTING MACHINE

Low investment cost makes DCMT most used in toy and novelty industries!



Bending Machine

Product of the O'Neil-Irwin Mfg. Co., 306 Eighth Ave., Lake City, Minn., the "Di-Acro" Hydra-Power Bender illus-



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Dressers in service. Offer outstanding features—Wheel is dressed from below, avoids removal of guard. Stop pins permit rotation thru 180° or 90° either direction. Wearever bearing is dustproof.

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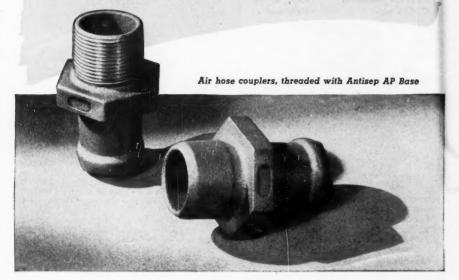
# This coupler manufacturer is now saving \$3750 a week - on threading alone

## ... since changing to Houghton's ANTISEP All-Purpose Cutting Base

The makers of these hose couplings formerly machined them in two operations. Now they have combined the two jobs, doing a finished thread in one operation . . . thanks to the cooling ability of our ANTISEP All-Purpose Cutting Base.

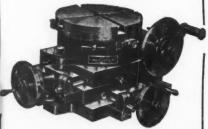
They make 1500 parts a day, and save half a cent per part over the former method. That means a saving of \$7.50 a day, or \$37.50 a week in anybody's arithmetic. This big saving was only possible because of the inherent cooling ability of Antisep Base and its low cost when mixed with water.

Yes, you have a diluted coolant at less than 7 cents per gallon, and it will do more jobs, better, than any cutting fluid on the market. A strong statement, but we'll back it up if you are ready to go over your cutting fluid requirements with the Houghton Man. A note to E. F. HOUGHTON & CO., 303 W. Lehigh Ave., Philadelphia 33, Pa., will bring him.



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With 71/2" Dial Type Rotary Table Mounted



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Rotary Tables • Multiple Spindle Index Centers • Vises • Screw Machines • Screw Head Slotters .

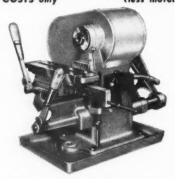
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It's the little Miller with the big reputation for accurate work. For production, tool rooms, schools, hobbyists. Send for catalogue of hand and power feed models.

#### The BURKE MACHINE TOOL CO. A Division of U. S. Burke Machine Tool Co.

A Division of U. S. Burke Machine Tool Co.

22 East 72nd St. Cincinnati 16, Ohio

trated herewith can be used to form simple, compound, and reverse bends in tubing, angle, channel, extrusions, moldings, strip stock, bus bars, round or square rods, and all other solid ductile material. A smooth even flow of power is said to be assured at all times by the Vickers hydraulic system incorporated in the machine. Engagement of a control lever starts the bending cycle, leaving the operator's hands free until the bend is completed and the bending motion is automatically stopped. A flick of the



"Di-Acro" Hydra-Power Bender

lever returns the machine at high speed to loading position.

The sturdy steel body and all other parts of the machine are designed to withstand unusually heavy loads. An automatic angle control is provided which allows a series of bends of varying degrees to be progressively made in a single part without removing the piece from the machine. Although the normal forming method of the machine is drawing the material around a rotating bending form, it is also said to perform "compression bending" by wrapping the material around a stationary form.

An outstanding advantage of the Di-Acro Hydra-Power Bender is that the bending motion can be operated in either direction, thereby eliminating interference which often results when forming parts containing numerous bends.

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Selective Spindle Rotation



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- Hardened and Ground Thread Feed Screws
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- Complete Line of Attachments

The Model No. 22 is available with power table travel and wet attachment.

COVEL'S SELECTIVE SPINDLE ROTATION especially for grinding carbide tools offers rough and finish grinding—without changing wheels or work set-up—maintaining the same direction of grind. This means endless time saved in set-up, mounting diamond wheels, and renewing badly chipped cutters.

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**OYEL** 

OUR COMPLETE LINE INCLUDES:

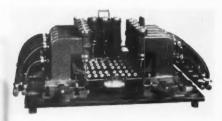
Drill Grinders, Universal Cutter & Tool Grinders, Hydraulic
& Hand Feed Surface Grinders

PRECISION GRINDERS

BENTON HARBOR, MICHIGAN

#### Multiple Head Pneumatic Riveters

Special multiple head pneumatic riveting machines have been added to the line of riveters manufactured by the



Hill Multiple Head Pneumatic Riveter

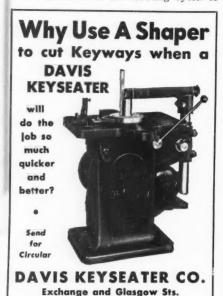
Hill Machine Co., Box 677, Rockford, Ill. The machines are made to suit the job, utilizing standard heads which may be spaced on centers as close as 2% inches. The air supply is handled through a single solenoid-operated air valve controlled by a foot switch in conjunction with an adjustable timer which limits the time of the riveting cycle. A

pressure reducing valve is also provided. By adjusting the air pressure and the riveting time, the desired peening effect can be closely controlled.

Illustrated herewith is a 13-head machine for assembling an electric stove heating element frame. Each head is provided with a pneumatic clamp to hold the part in the locating fixture. The position of the heads can be adjusted to accommodate various sizes of frames.

#### **One-Point Press**

An enclosed one-point press announced by the E. W. Bliss Co., Toledo 7, Ohio, is available in capacities of 500 tons and larger, and features a box type crown, long, fully enclosed slide, barrel type slide adjustment, and Meehanite castings throughout. Minimum headroom is said to be required for the press, since the main drive unit is low and the clutch and flywheel assemblies are outside the crown. The crown, a long, deep, box type structure, extends below the main gears, providing a rigid connection between the front and rear members. Font and rear crown panels are individual box sections.





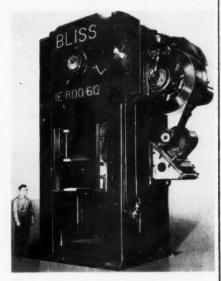
#### **OLIVER MACHINERY COMPANY**

Grand Rapids 2, Michigan

ROCHESTER, N. Y.

The box type slide has a power elevating unit consisting of a worm driven barrel type connection, and is completely guided by long gibbing throughout any position of stroke and adjustment. Flat gibbing is used on the pressure side of the slide, and adjustable 45-degree gibs are used on the other side.

The main drive is fully eccentric, having a twin drive for balanced loading. The main shaft rotates in the crown bearings and does not carry torsional load. A cascade oil lubricating system

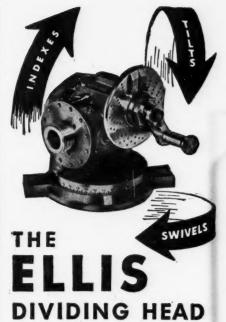


Bliss Enclosed One-Point Press

is used throughout except for the gibways and roller bearings, which are grease lubricated.

Hand Tapper

Identified as the Model HT-250, a bench type hand tapping machine designed for sensitive, precision small-hole tapping has been announced by H. D. Herder Tool Specialties, 2424 Brook Drive, Kalamazoo, Mich. Primarily intended for use by tool and die shops, school and service shops, experimental departments, light assembly production plants, and so on, the unit is claimed to ensure accurately tapped right-angle holes with minimum tap breakage and long tap life.



Many unique features make the ELLIS Dividing Head more than an ordinary indexing fixture. It is a precise, rugged unit with 6½" normal swing increased to 11" swing through the use of riser blocks. It TILTS more than 100 degrees in the vertical plane—SWIVELS 360 degrees in the horizontal plane—INDEXES by crank, or directly by hand. Work is held between centers, or in chucks or collets. The ELLIS Dividing Head is a universal work head that will increase the production versatility of your milling machines, grinders, drill presses and jig borers—write for complete details today.



50-H CHURCH ST., NEW YORK 7, N. Y.

Four collets designed to accommodate taps in sizes from No. O through ¼ inch are supplied with the machine. The collets are said to provide positive drivethrough due to a square socket and shank design. A knurled threaded collar (removable by hand) is used to hold and centralize each collet and tap. Either right or left-hand taps may be employed.

The adjustable spindle arm of the machine is arranged for swinging to the right or left and may be quickly positioned for height. The maximum distance from the machine base to the bottom of the tap is 6 inches. The two clamps used

for holding work to the base are adjustable for various job applications and are also said to equalize tap torque. The



Herder Model HT-250 Hand Tapper

spindle is provided with an extra long bearing to ensure rigidity and long life. Ball and spring tension against the spindle is said to prevent the spindle from falling to low position.

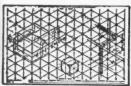
#### Hydraulic Pump

The Lyon-Raymond Corp., 22559 Madison St., Greene, N. Y., has introduced a continuous-acting air-operated hydraulic pump designed for use on its hydraulic elevating tables, hydraulic positioners, and hydraulic strip and sheet feeding tables, as well as various other prod-



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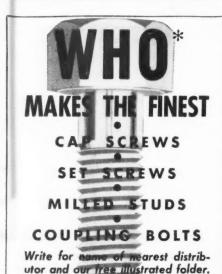


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make you another steady user of WADE'S ISOMETRIC blue lined paper. Shows all surfaces and interior to scale.

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Wade Instrument Co. Dept. H, R.F.D. \*1



YORK,

\*Wm.H. Ottemutter Company

PENNA.



Lyon-Raymond Continuous-Acting Air-Operated Hydraulic Pump

ucts requiring similar pump specifications. The air motor of the pump is so arranged that it operates continuously merely by holding open the valve which controls the air supply. A reciprocating valve alternately diverts air pressure from one side of the air piston to the other. The relatively large air piston is directly connected to a small hydraulic piston which pumps oil under high pressure.

The pump is equipped with a built-in

release valve to permit pressurized oil in the hydraulic cylinder to return to the reservoir by gravity. A single three-position four-way valve operates the release and controls the pumping action. A working oil pressure of 1,000 p.s.i. can be obtained from a 90 p.s.i. air pressure. Higher working pressures are also available. The displacement of oil per strokecycle is 3.4 cubic inches. Depending on the air pressure, from 1.0 to 1.5 gallons of oil can be pumped per minute. The air consumption is 3.5 c.f.m. (90 p.s.i.) at an average pumping rate.

#### Forge Furnace

An improved gas-fired forge furnace designed for heavy duty and continuous operation at a forging temperature of 2,200 deg. F. has been announced by the Eclipse Fuel & Engineering Co., Rockford, Ill. The furnace shell is constructed of heavy angle framework, with the sides and back of steel plate electrically welded to sturdy structural steel legs. Heat loss through the furnace walls is said to be minimized by the use of high quality installed firebrick.

The burners used on the furnace are of the semi-nozzle mixing type and are lo-

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The CLARK gives you accurate results for every production requirement. It is durably built to give you years of dependable service. It is fast and simple to operate; easy to maintain. Compare the CLARK and see for yourself how much more it has to offer.

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Model C-8A \$450.00 F.O.B. Detroit Complete with diamond penetrator cated so as to prevent flame impingement on the pieces being heated and to provide uniform heat distribution. A gover-



Eclipse Improved Gas-Fired Forge Furnace

nor provides for automatic and efficient control of the air-gas ratio throughout the entire range of each burner, which is designed to use low pressure gas. High pressure burners can be provided if desired. To assure maximum safety and

Memore: STEEL STAMPS & MARKING DEVICES

That Newco bevel on New Method's does a swell job of giving clear markings with less effort and longer stamp life.

Better get a copy of their catalog and look it over for ways and means to cut our marking costs. Write to:

NEW METHOD STEEL STAMPS, Inc. 149 Joseph Campau, Detroit 7, U.S.A. comfort, the operator is protected by a curtain of air which carries the heat away from the operator and behind a specially designed refractory lined shield which is adjustable to cover the section of the furnace slot not being used.

#### Torque Indicating Stud Driver

To increase production and maintain uniform torque in driving studs, a power driven torque indicating stud driver which is said to be capable of driving right or left-hand studs up to ½ inch-13 threads and can be used with a drill press, air motor, or electric drill has been developed by the Industrial Engineering Co., 730 E. Sample St., South Bend 18, Ind. With the unit, any desired torque can be maintained, it is claimed.

As a stud is driven, the operator watches two small signal lights on the front of the stud driver. A green light glows until the predetermined torque has been attained, at which time the light goes off and the stud is properly set. Should the stud be driven too tightly, a red light glows. The range between the green light and the red light is adjustable and is set by a knurled screw.







Original Electric Etcher. Thousands in Daily Use

Mark hardened parts, tools, dies, gages and fixtures of any ferrous metals including the hardest alloys and carbides—quickly—plainly. • Three sizes to meet all requirements.

· Write for circulars and prices.

BREWSTER-SQUIRES CO.

P. O. Box 191

Tenafly, N. J.

A calibrated torque wrench attached to the stud driver is used as a standard. During the driving operation, the torque wrench indicates the torque being used to drive the stud. For ease and speed of operation, a reversible clutch is built into the driver in such a way that the conventional stop on the drill press may be set to drive the studs to the correct height automatically.

In addition to stud driving, other uses



Torque Indicating Stud Driver Mounted on Drill Press

for the tool include the power tightening of cap screws, nuts, and so on, to a predetermined torque.

#### **Automatic Work Driver**

Designed specifically for use on all Monarch lathes having either a 6-inch Type D-1 spindle nose or a 6-inch Type A-1 spindle nose, an automatic work driver of the serrated jaw type has been annunced by The Monarch Machine Tool Co., Sidney, Ohio. Recommended for in-between center operations of all types where marking of the driving surface is permissible. the unit is designed for easy loading and unloading. When the spindle is started, a lever arm actuated jaw clamps the work so that the heavier the



Accurate because self-expanding pressure principle maintains concentricity and alignment, even when sleeves become worn. Faster because maximum area of shoe contacts work at all times. Specially tempered S-shaped spring applies constant, self-adjusting pressure against sleeves. Never galls or seizes. Worn sleeves can be replaced in a jiffy! Complete sets of 6 (in stand): one each 1/8", 3/16", 1/4", 5/16", 3/8" and 1/2".

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Live C	enters [] Etcl agnetizers	ers 🗌 Tacho	meters
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cut, the harder the driver pulls. If the spindle is stopped quickly, the driver opens automatically. However, should the spindle be stopped gradually, it is necessary for the operator to rotate the outer portion of the driver slightly to free the work for removal.

The work driver is supplied with two sets of standard jaws, one set having a capacity of from 1 to 2¼ inches and the other of from 2¼ to 3½ inches. Also available is a third set with a capacity of from ½ to 1¼ inches. The various sets of jaws are interchangeable in the body, and each set is adjustable over its entire range





For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheet, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for trial sample and circular.

MICHIGAN CHROME & CHEMICAL COMPANY
6340 E. Jefferson Ave. • Detroit 7, Mich.



Close-up View of Automatic Work Driver Installed on Monarch Mona-Matic Lathe

Since the jaws are of the floating type, they are said to compensate for a reasonable amount of eccentricity.

#### Carbide-Tipped Circular Saw

Produced by a method that is claimed to eliminate uneven stresses and strains in the blade, as well as objectionable noise and vibration in operation, a carbide-tipped circular saw to be known as the Meyco "Vibra-Free" Saw has been announced by the W. F. Meyers Co., Inc., Bedford, Indiana.

Slots are cut in the saw blank similar to spokes in a wheel and are then filled with a material having different harmonic qualities than the steel saw body. In this manner, objectionable noise and vibration are controlled at their source. The slots are so designed that when the disharmonizing material is inserted, it becomes self-locking and therefore safe in use, the manufacturer states. It is further claimed that the Vibra-Free design allows for the relieving of brazing

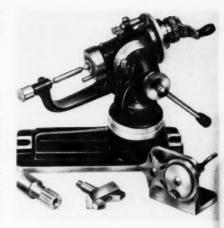


stresses, permitting as many teeth in the saw as are required to do the job without incurring any objectionable high-pitched whistle.

#### Collet Index Fixture

Known as the "All Tool," a collet fixture for use in grinding, milling, indexing, drilling, and inspection operations is now being marketed by Eastern Machine & Tool Co., 170 Broadway, New York 7, N. Y. The fixture, which is constructed to fit a No. 2 surface grinder and has an adjustable and removable center attachment, can be used in grinding cylindrical, conical, round, square, rectangular, or other shaped objects. The fixture is so arranged that work can easily be checked with a profile projector without taking the work out of the collet. The maximum collet capacity is 1 inch.

The fixture is 9½ inches long x 5 inches high x 6 inches wide, and weighs 15 lb. The spindle is hardened, ground and lapped. Other features of the fixtures include quick locking knobs; removable lever for the locking knobs; fixed diamond for wheel dressing which can be used in either an upright or side posi-



"All Tool" Collet Index Fixture

tion; crank for rotating work and for locking or releasing the collet chuck; and heavy machined and ground base which can be clamped on a machine table or held on a magnetic chuck.



#### Saw Sharpener

Designed to sharpen saws from ¼ to 12 inches in diameter and with teeth from 45 to 2 per inch inclusive, the Hamco Saw Sharpener illustrated herewith has been announced by the Hamberger Machine Co., 99 Mt. Hope Ave., Rochester 7, N. Y. Features of the unit include a graduated wheel dressing attachment; three-power magnifier; cast aluminum frame with gray crinkle finish; micrometer setting adjustment; clutch; graduated reset dial; stroke adjustment and lock; precision high speed spindle bearings; rubbermounted ¼-h.p. 110-volt single phase €3-

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STANDARD





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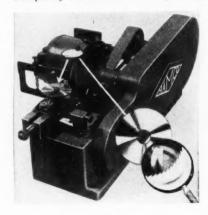
PENNSYLVANIA

ANTE BEAVER BALLS DA .

HAMMOND, I

cycle motor; and precision ground and hardened parts throughout.

Compactly made, the saw sharpener oc-



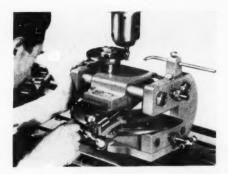
Hamco Saw Sharpener

cupies a bench space of 29 x 14 inches and weighs 83 lb. The machine is furnished complete with arbors for all size saws within its capacity, as well as friction clamps for large and small saws. If desired, the unit can be supplied with an adaptation arbor for grinding angular tooth saws as an extra feature.

#### Cam Cutting Machine

Known as the "Helix-Master," a cam cutting machine which is claimed to produce mathematically perfect cams without any preliminary layout is now being manufactured by the Sheffer Collet Co., Traverse City, Mich. Through the geometric action of three compounded slides, the unit is said to assure lobes





"Helix-Master" Cam Cutting Machine in Use

with a consistent rise through every 1/100 segment. The surface profile is generated in one continuous sweeping motion.

According to the manufacturer, the Helix-Master will produce an accurate cam directly from engineering computations without any drawings, templates, or preliminary layout. The unit is entirely self-contained and may be mounted on any suitable machine tool such as

a milling machine, grinder, or drill press. The Helix-Master is not geared, linked, or synchronized in any way to the machine tool on which it is used; consequently, it does not require any machine to be confined to the single purpose of producing cams.

#### Pneumatic Die Cushion

The Dayton Rogers Mfg. Co., 2824 13th Ave., S., Minneapolis 7, Minn., has announced a pneumatic die cushion, designated as the Model 2CC-16, which is designed to operate off the average shop air line and is provided with convenient pressure lubrication fittings. According to the manufacturer, the cushion is particularly adaptable to large straight side presses and is constructed to develop ring-holding pressures varying from 15 to 25 tons. A special superstructure is furnished for each installation, and each unit is engineered for a definite punch press requirement.

The extra heavy duty pin pressure pads of the Model 2CC-16 are available in sizes of 28 x 36 up to and including 34 x 46 inches and are custom made to fit the individual press bed opening. The pin pres-

# Sharpens taps AUTOMATICALLY!

Save Money on 7 Different Jobs Automatically grinds straight flutes from solid

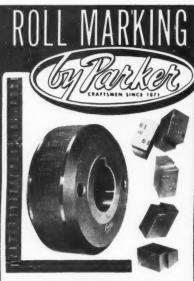
- 1. Flutes in small taps.
- 2. Spiral points in gun taps.
- 3. Small reamers.
- 4. Angular Milling Cutters.
- 5. Side Milling Cutters.
- 6. Woodruff Key Cutters.
- Sharpens saws as small as ½" and up to 8" in diameter, and in gangs up to 3¾" in thickness.

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Wardwell Automatic Universal Flute Grinder Write today for Bulletin 50-F.

THE WARDWELL MANUFACTURING CO. 3166 Fulton Rd., Cleveland 9, Ohio



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Sharp, Clean, Uniform High-Speed marking of steel rules, squares and scales - just one of the many jobs where Parker ROLL MARKING DIES prove their worth.

For marking flat or round pieces, the interchangeable characters and symbols enable one Parker ROLL DIE to eliminate many old-fashioned, expensive solid roll dies, Versatile-money saving - for use on Mark-

ALL PARKER DIES ing Machines, Hand ARE Hyper-Honed or Power Milling . . a super finishing process for increased resistance to wear . . for greater self centering of any

production. Write for FREE 16 page MARKING



Machines or Lathes. Patented "Taper-

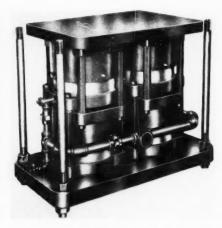
Lock" device insures

positive locking and

type combination.



CRAFTSMEN SINCE 1871



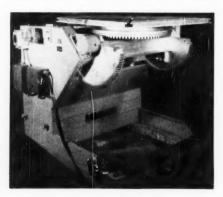
Dayton Rogers Model 2CC-16 Pneumatic Die Cushion

sure pad design ties the die cushion units together in permanent alignment and will compensate for a maximum amount of off-center loading, thus making the cushion adaptable for all large deep drawing punch press requirements, the manufacturer states.

#### Welding Positioner

Aronson Machine Co., Arcade, N. Y., is now manufacturing a heavy duty gear driven positioner for welding and assembling which is available in models with capacities of 2,500, 3,000, 4,000, 5,000, and 6,000 lb. According to the manufac-

Aronson Heavy Duty Gear Driven Positioner



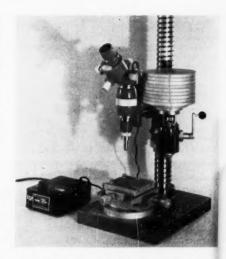
turer, the work table, through a gear motor, can be tilted 135 degrees in 40 seconds and is provided with speeds that are infinitely variable from 0 to 0.75 r.p.m. on all models.

Other features of all models include frame and sheet enclosures for the motors, variable speed drive, and reducer units. The controls are conveniently located on one side of the positioner for ease of operation. A 12-foot remote push button is standard equipment. The elevating sub-base of the positioner is adjustable up to 24 inches.

Hardness Tester

Identified as the Z323, a Vickers precision microhardness tester using a diamond pyramid indenter of 136-degree angle is now being marketed by PTI, Inc., 401 Broadway, New York 13, N. Y. The microscope of the unit is designed to enlarge 100, 200 and 400 times and is illuminated by a powerful lamp. Reading is facilitated by a practical sliding scale, and measuring precision is said to be 0.001 mm. (0.00004 inch).

The hardness tester and microscope are located on a ring arranged for swinging around the ground steel col-



Z323 Vickers Precision Microhardness Tester

umn, and are claimed to be absolutely concentric. The test load is applied directly to the diamond pyramid and can be varied from 0.25 to 10 kg. The test



Write for CATALOG 480 showing types for all secondary finishing operations.

Users report production increases of 50% to 100% over former methods when Schauer Speed Lathes are used to polish, lap, de-burr or finish metal or plastic parts. These high-production machines do the job speedier, better, and at lower cost.

SCHAUER MANUFACTURING CORP. - Originators of Today's Speed Lathes 2060 READING ROAD CINCINNATI 2, OHIO \_

load can be readily changed by adding or removing one or more of the weight rings located on top of the indenter pin. The indenter is arranged to enter gradually into the material, an oil brake absorbing all shocks.

#### Die Filing Machine

Identified as the Model 1500-SR, a precision die filing machine with manual speed control has been announced by the All American Tool & Mfg. Co., 1014 Fullerton Ave., Chicago 14, Ill. The ma-

#### DUAL CROSS and ROTARY FEED

### PALMGREN MILLING TABLE

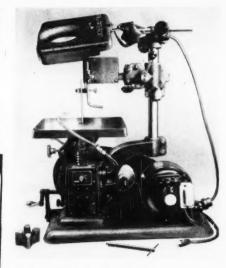
No. 83 Only \$49.50

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Has 8" table, 360° movement and 4" cross feed travel. Adjusting wheels and dials graduated in degrees and thousandths.

Slotted for bolting to table. No. 82 without rotary feed \$39.75. Write for Circular No. 354.

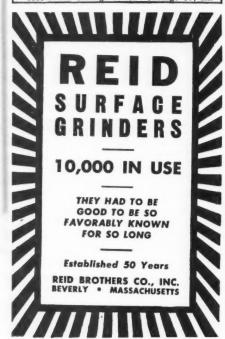
CHICAGO TOOL and ENGINEERING CO. 8399 South Chicago Ave. Chicago 17, Ill.



All American Model 1500-SR Precision Die Filing Machine

chine is supplied complete with a universal joint file clamp and file setting square which enable the unit to be quickly and accurately set to a 100 per cent vertical file position. A flexible metallic hose chip blower permits air to be readily directed at the work being filed.

Infinite speed changes within a range of 170 to 470 strokes per minute are said to be obtained with the manual speed control device of the machine, thus affording speeds low enough for filing high chrome-high carbon steels and high enough for honing operations. The scotch yoke mechanism which actuates the file operates in a sealed oil bath. Sawing and honing attachments are



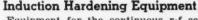


available with the machine. An illuminated magnifying glass for attachment to the overarm post is also available.

#### Tapping Head

Known as the "Tap King," a high speed tapping head now being manufactured by the Procunier Safety Chuck Co., Dept. 26, 12 S. Clinton St., Chicago 6. Ill., is said to simplify large hole tapping, provide long tap life, and maintain an accurate, uniform thread depth. The unit has a capacity of % to 1 inch in steel and 1½-inch in softer materials...

Construction features include a



Equipment for the continuous r-f selective induction hardening of cylindrical parts at feed rates up to 6 inches per second is available from the Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa. The equipment consists of three major components; namely, an automatic loading device, horizontal rotating scanner, and industrial radio-frequency generator.

The automatic loader, consisting of a magazine and hopper, is arranged to feed the pieces to be hardened to the scanner through a feeder unit. The



Procunier "Tap King" Tapping Head

smooth, powerful friction clutch; a spline drive to tap holder spindle; ball and needle bearings; a helical back gear reversmechanism; ing and a rigid, accurate, lightweight tap holder. The head is available with a No. 3, 4, or 5 Morse taper shank and is also made in a cover clamping model for maximum rigidity. accuracy, and long life.



equipment provides the desired hardness by passing the work through an inductor coil and spray quench ring. Uniformity



Westinghouse K-F Induction Hardening Equipment

of case depth is obtained by controlled feeds, and concentricity of case is said to be assured by positive guiding and rotation of the cylindrical workpiece about its longitudinal axis.

The Westinghouse R-F Induction Hardening Equipment can be used to

harden a wide variety of cylindrical parts in any desired hardness pattern by the simple adjustment of electronic timing circuits.

#### Linear Actuator

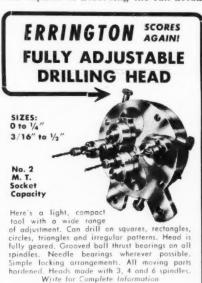
Airborne Accessories Corp., 25 Montgomery St., Hillside 5, N. J., has announced an improved model "Lineator," an electrically-operated linear actuator for use in both aircraft and industrial fields where the flexibility of an electrically controlled device is required to generate thrust. The unit has been redesigned to incorporate a mechanical synchronizing feature to permit pairs of units to operate in unison regardless of load variations. A typical installation of this type is shown in the accompanying illustration. According to the manufacturer, the synchronizing feature provides a solution to the problem of im-parting thrust at an identical rate in separate locations. The flexible shaft connecting the separate units handles only the differential power.

In addition to the mechanical synchronizing feature, the improved actuator also incorporates a revised non-turn device capable of absorbing the full actua-



**ECONOMY** MACHINE PRODUCTS COMPANY

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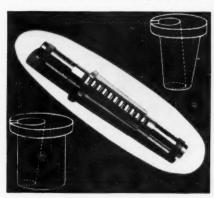
Airborne Improved "Lineators" Mechanically Synchronized with Flexible Shafting

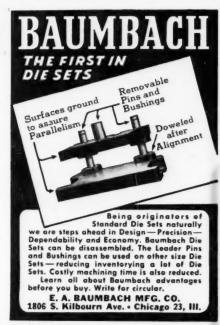
tor torque in the event of striking a positive overtravel stop at full voltage with no resisting load; an improved radio noise filter; and an increased motor power and duty cycle rating.

#### Tapered Bushing-Type Adapter

The Kase Machine Co., 18432 Buffalo Ave., Cleveland 19. Ohio, has announced the availability of a tapered eccentric bushing-type adapter designed to facilitate the cutting of (1) tapered keyways in straight bores, (2) straight keyways in tapered bores, (3) tapered keyways in tapered bores with standard Glenny broaches. The adapter is made in sizes ranging from ½ to 2 inches in increments of ½ inch and can be furnished with a

Tapered Adapters for Glenny Broaches







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standard taper of 1/8 or 3/4 inch per foot.

To cut a keyway in a tapered bore, the proper size adapter is inserted into the workpiece and a standard broach is passed through it to make the cut. A shoulder on the adapter prevents it from following through during the cutting operation. Fabricated of hard chrome plated steel, the adapter is available to fit all standard Glenny broaches and can be made to order for use with special broaches. Adapters designed for use with any particular size broach will accommodate all the interchangeable blades that can be used with that specific Glenny broach.

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DUSTKOPS

20 Models 300 to 3600 cfm 1/4 hp to 5 hp

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#### Multiple Spindle Adjustable Drill Head

A midget multiple spindle adjustable drill head which is said to fit any make of drill press has been announced by Aiman's Machine Tool Engineering

Co., 109 S. Broadway, Pendleton, Ind. The head is available in a twospindle model and a four - spindle model. The two-spindle model has a close center setting of 0.750 inch and a wide center setting of 2.062 inches. The fourspindle model has a close center setting of 1.218 inches and a wide center setting of 2.375 inches in a bolt circle. In a square pattern, the close centers are % inch and the wide centers are 111 inches on the four-spindle model.



Aiman's Midget Drill Head

The Aiman's Midget Drill Head can be made with either a straight shank drive shaft or a No. 1 Morse taper drive shaft. The spindles on both models of the head are claimed to operate on any setting in a full 360-degree range. Force feed oiling to all bearings and gears is said to assure efficient operation. Drill drive is effected with collet chucks, and the head is designed to drill holes from 0.013 to 0.1875-inch drill size. Standard equipment includes one collet of a specified size for each spindle, straight shank or No. 1 Morse taper drive shaft, and a mounting adapter for the selected drill press. A complete collet set comprises six collets to cover the full range of drill sizes from 0.013 to 0.1875 inch.



## M - D Facing Heads

Can be attached to Boring Mill Bar, and Drilling or Milling Machine spindles. Single point tool travels radially, from center outward or reverse; feeds automatically. Sizes 6" to 46" diameter.

Write for circular.

MUMMERT - DIXON CO.
120 PHILADELPHIA ST. HANOVER, PA.

#### Vibration Mount

Known as the "Finnflex" CM-H, a vibration mount designed to provide a complete and efficient means of isolating ma-



"Finnflex" CM-H Vibration Mount

chinery vibration is being marketed by Finn & Co., 2850 Eighth Ave., New York 30, N. Y. The mount is intended for use with precision grinders, lathes, generators, pumps, compressors, jig borers, and other machinery where horizontal and rotating vibrations are present.

Vibration isolation and attendant noise reduction are accomplished through the "rubber-in-shear" principle. The mount consists of a specially designed steel channel floated in rubber between two steel angles. The correct angularity between the steel parts and the rubber firmly bonded thereto enables the isolator to approximate the "flat" spot on a stress-strain curve of relative slope. Since the spring index (load divided by deflection) is not constant, resonance is said to be avoided.

Designed to provide uniform deflection and a load range from 600 to 10,000 lb., the Finnflex CM-H Vibration Mount is 2 inches high overall and is furnished drilled and tapped, ready for use.

#### Marking Stamp Set

A set of fractional figure metal marking stamps designed for maximum economy has been added to its "Rams Head" line by the Acme Marking Equipment Co., 8030 Lyndon, Detroit 21, Mich. Each stamp in the set is made of high grade tool steel, blued for rust prevention, with the striking head tempered by a special process that is said to prevent chipping or mushrooming.



#### NIBBLE YOUR COSTS

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> Capacity 3/4" mild steel



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Manufactured by W. J. SAVAGE COMPANY

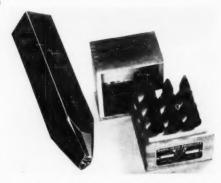
Knoxville

Since 1885

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Pioneer Mnfrs. of Nibbling Machines





Acme "Rams Head" Metal Marking Stamp Set

front with the character designation, which also shows the correct position for stamping. In addition to the complete set, individual stamps are available if desired. The set is furnished in a sturdy, compact hardwood case with individual compartments for each stamp.

#### Soldering Gun

Said to be capable of handling 250 watts, a soldering gun designed for heavy duty soldering operations has been developed by the Weller Mfg. Co., 808 Packer St., Easton, Pa. Designated as the Model WD-250, the gun, it is claimed, can be

Weller Model WD-250 Heavy Duty Soldering





### WALTHAM

#### **Pinion and Gear Cutting Machines**

with revolving cutter will make 1, 2 or 3 successive cuts for watch pinions or may be used for fine pitch gears up to 1½" dia. Blanks are held and indexed by work spindle and usually sup-ported by a tail center. Only straight teeth can be cut. Write for Bulletin No. 112.

#### WALTHAM MACHINE WORKS WALTHAM

Pinion and Gear Cutting Machine, Thread Milling Machine, Cylindrical Sub-Presses, Cutter Sharpening Machine, Small thread milling and gear cutters, Small special machinery. used for every type of soldering encountered in electrical circuits, including gen-

erator commutator work.

Five-second dual heat, prefocused spotlight, and "Rigid-Tip" are outstanding features of the gun. The tip design provides a maximum of copper in the chisel-shaped head, with the basic structure providing a bracing action—an arrangement which is said to be advantageous in heavy duty soldering. The streamline lightweight design of the tool provides terminals in an over and under position, thus affording maximum accessibility to hard-to-get-at places and increased visibility with built-in spotlight.

#### **Optical Measuring Instrument**

Distributed by the National Tool Co., 11200 Madison Ave., Cleveland 2, Ohio, the Pocket Comparator shown herewith is a high-precision optical measuring instrument for the inspection of small parts or small dimensions on large parts. The instrument embodies a magnifying lens which permits the part to be checked against a finely calibrated pattern or reticle. The lens is a triplet-design aplanatic type of high accuracy and has a magnification of approximately 7 to 1.

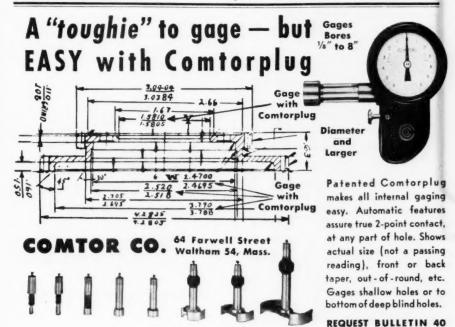
The reticle of the Pocket Comparator is calibrated for measuring lengths, widths, complete circles, radii and angles. The upper part of the reticle has lengths graduated in steps of  $d_1$ ,  $d_2$ , 14, 32, 1/8, 1/6 and 1/4 inch. There is also a linear rule of 1/2 inch with 0.005increments. and a 10 mm. linear rule with 0.2 m m. increments. Circles are shown graduated from



Pocket Comparator

0.092 to 0.050-inch diameter and from  $\ell_1$  to  $\ell_1$ -inch diameter. The lower half is patterned to measure angles between 0 and 90 degrees in steps of 5 degrees, and to measure radii from  $\ell_1$  to  $\ell_2$  inch.

The Pocket Comparator separates in the middle for two purposes: (1) to permit cleaning the interior optical surfaces, and (2) for adjustment of focal length to meet the eye requirements of the individual using the instrument. Transparent, plastic material is used between the lens



and reticle to permit the entrance of light on the recticle and work to be measured. In the toolroom, the instrument is said to be ideal for checking forms and sizes of punches and dies; for checking gages. templates and layouts; for checking the forms and dimensions of all types of cutting tools; for checking the amount of wear on the cutting edges of all types of cutting tools, punches, and so on; for checking the ground form on conventional tool bits; for checking the form on circular and flat form tools; and for checking the size of small holes, fine threads and wires.

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The inherent hardness and durability of granite
accurately finished to a guaranteed tolerance o
.00005", provide the most efficient and economical surface plates for precision measurement operetions. Sizes up to 8" × 16".

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The Pocket Comparator can also be employed for production checking, such as for checking radii, angles, chamfers,

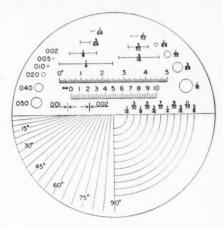


Illustration showing manner in which reticle of Pocket Microscope is calibrated for measuring lengths, widths, complete circles, radii and angles

threads, small holes, lineal, radial and tangent dimensions, odd shapes, and so on, on machined, stamped or cast production parts. In addition, it may be used for the establishment of standards and the inspection of bubbles, blowholes, cracks or other flaws in die castings, molded parts, and so on.

#### Cylinder Wheel Holder

The Blanchard Machine Co., 64 State St., Cambridge 39, Mass., has announced a holder for cylinder grinding wheels which is available for Blanchard Nos. 11

### **ADVANCE CLAMPS**

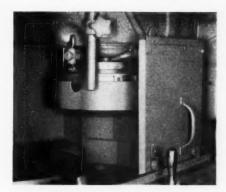
Cut Set-Up Time 75%

#### MILLING MACHINES

THE ONLY T-SLOT CLAMP
For use on all machines with T-slots.

Manufactured and sold by

ADVANCE MACHINE WORKS



Blanchard Cylinder Wheel Holder in use

and 18 surface grinders. Specially designed spring clamps are provided for holding a wheel firmly in place, eliminating the need for sulphuring wheels into rings and allowing for quick wheel changing.

#### Sheet Cutting Machine

Said to be capable of straight, circular, and irregular cutting, in addition to folding, beading, and slotting, the Pullmax Model P-5 Sheet Steel and Plate Cutting Machine illustrated herewith has been placed on the market by The American Pullmax Co., Inc., 2627 N. Western Ave., Chicago 47, Ill. The working mechanism

Pullmax Model P-5 Sheet Steel and Plate Cutting Machine



## D&M

## Automatic Punch Press Guard Insists Upon Safety

Guards the Danger Point at much less cost



SWINGS AUTO A STOCKLY PAST
THE DANGES POINT
DRIVES THE AND TO SAFETY

POSITIVE The Guard automatically drives the operator's hand out of danger.

FLEXIBLE A turn buckle and threaded rod insure easy adjustment.

Only nine working parts based upon elementary principles.

There are no sliding parts. Nothing to get out of order. • Write today and inquire about our thirty day free trial so you can prove to yourself that the D & M Automatic Punch Press Guard is a thoroughly efficient, durable and reliable press guard.

of the machine is entirely enclosed and operates in an oil bath. Circle cutting and straight cutting attachments are provided with quick-locking devices that permit size changes in one movement for fast operation, as well as for production work.

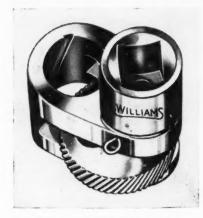
The Pullmax Model P-5 has an edge cutting capacity from finest gauges up to  $\vec{v}_2$  inch in mild steel and is designed to cut circles from  $3\frac{5}{32}$  up to 40 inches in diameter. The throat depth of the unit is 42 inches.

Mention MODERN MACHINE SHOP when writing to advertisers.



#### Stud Remover

Designated as the No. S-60B, a stud remover for use with ½-inch square drive handles and attachments has been placed



Williams No. S-60B Stud Remover

on the market by J. H. Williams & Co., Buffalo 7, N. Y. Said to be equally efficient for removing or setting studs, the unit includes an eccentrically mounted roller with deep milled edge that is claimed to provide a non-slipping and non-burring gripping surface.

The Williams No. S-60B Stud Remover has a capacity for studs from % to % inch in diameter and is made from selected alloy steel, heat treated and chrome plated.

#### Dial Bore Gage

Utilizing a design similar to that employed in the construction of its inside micrometers, the Rimat Machine Tool



## **GAMMONS WELDERS' SEATING REAMERS**

for replaceable Welding Tips

Duplex Design • End Cutting

Stocked in 4 Sizes

GIVES PERFECT SEAT FOR NEW TIPS

Manufacturers of helical taper pins,

chucking, die makers, and special reamers.

GAMMONS HOAGLUND CO.





Rimat Dial Bore Gage

Co., Dept. MS, 1117 Air Way, Glendale 1, Calif., has developed a dial bore gage for quickly and accurately measuring the diameters of internal grooves for 0-rings, snap rings, oil rings, and so on, as well as diameters of straight bores. The instrument is designed for ready location on the diameter of the cut to be measured, and its indicator dial is said to immediately provide the desired dimension.

Said to require a minimum of skill in measuring deep as well as shallow holes, the gage, in the standard design, can be used to measure all diameters from ½ to 6 inches. Special models can be produced to meet unusual requirements. The instrument is offered in two series, the Series S providing direct readings in thou-

sandths of an inch over the entire range of the instrument and the Series T providing plus and minus indications in tenths of thousandths of an inch for any dimension to which the gage is set. Corresponding models in both series have the same relatively wide range. Standard tip sizes are  $\frac{1}{16}$  and  $\frac{1}{26}$  inch o.d. on specific models. However, where these are too large, special tips are available for measuring snap rings as small as 0.030 inch in width.

#### Safety Tools

The Delaware Tool Steel Corp., Wilmington, Del., is now marketing a line of "Safe-T-Kut" tools which consists of



"Delsteel" Alloy "Safe-T-Kut" Chisel

hand chisels, pneumatic and electric hammer chisels, center punches, paving breaker steels, back-out punches, blacksmiths' tools, and so on. Constructed from "Delsteel" Alloy, the tools incorporate



special features that stress safety in use.

Magnetic particle inspection of each tool is said to reveal any defects such as laps, seams, forging, grinding or heat-treating cracks not visible to the eye. A special design of striking end on each hand tool minimizes the amount of metal coming in contact with the striking hammer, thus providing for a diminished tendency of the tool to spall or "mushroom." The special heat treatment of the striking end of the hand tools produces a striking surface that is sufficiently hard to resist mushrooming but not hard enough to cause spalling.

### RECLINABLE POWER PRESSES



Ideal for general stamping work . . . 4 to 100 tons capacity. Can recline to 40° with perfect safety.

Our catalog contains a wide variety of press types, and sizes. Write for it today.

year serving worldwide industry with Patent Percussion, Open Back, Double Crank, Punch, Horn, and Toggle and Straight Side Presses, Dial and Roll Feeds.

### ZEH & HAHNEMANN CO.

190 VANDERPOOL ST., NEWARK 5, N.

#### Clutch Coupling

Designed to accommodate shaft from 1% inches in diameter (in 16-inch increments) standard keys, a clutch coupling taper utilizing bushings has been added to the line of Rawson products manufactured the Centric Clutch Co., 22-26 South Ave., W., Cranford, N. J. Adjustable right on the job for various horsepower requirements, the coup-



Rawson Clutch Coupling: (Above) Motor Half, (Below) Driven Half

ling consists of two sections—a motor half and a driven half. A split taper bushing is used to wedge the tapered coupling hub firmly to the shaft, thus assuring an accurate fit.

The coupling is furnished ready for use with motors from 0.43 h.p. at 580 revolutions per minute to 25.7 h.p. at 1,800 revolutions per minute.

#### Spring Scriber

A spring scriber which can be used for scribing fine and distinct lines on contours as well as flat surfaces is now being marketed by the C. E. Craley Tool Co., Dept. MMS, 110 Chestnut St., Shillington, Pa. The scriber is hardened and ground with 0.1875-inch lapped hole to ensure the smooth action of scribing points, and is approximatey 2% inches long overall.

Ground to 0.500 inch in diameter to fit a standard collet, the holder is furnished with two interchangeable high



# COMPLETE ROLL FEED — READY FOR MOUNTING Model A-A --- \$129.50

Feeds stock up to 11/2" long and 2" wide. Can't slip . . . Adjusts and reverses instantly. No pawls . . . No ratchets . . . Feeds in thousandths.

Write for circular and data sheet.

ROLL FEEDS CORP. MIDDLE ST. AT CENTRAL AVE.

Builders of ELECTRIX Precision Die Miller

speed scribers, both of which are ground with 60-degree angular points. One scriber has a flat ground on one side



Craley Spring Scriber

approximately  $\frac{1}{2}$  inch and not quite to center which aids in layouts to shoulders or stepped surfaces.

#### Revised Adjustable Hand Tool Holder

The M. E. Cunningham Co., 158 E. Carson St., Pittsburgh 3, Pa., has announced a revision of Sizes No. 1 and No. 2 of its "Luminum-Line" Adjustable Hand Tool Holder. Designed to prevent smashed fingers in the use of steel stamps, cold chisels, drifts, punches, and other hand tools, the holder now weighs considerably less and is more easily operated, the manufacturer states. The improved design permits the slotted head section to be pushed out and stamps quickly changed by the first finger and thumb.

The Size No. 1 holder is applicable to ¼ and ½-inch tools and the Size No. 2 holder to ¼ to ¾-inch square tools. Each



Cunningham Revised "Luminum-Line" Adjustable Hand Tool Holder

size holder can be used with square, round, octagon, and hexagon shaped tools.



## Desmond precision ball bearing type dresser cuts wheel dressing costs in half

Many companies find Desmond's new precision ball bearing dressers will substitute for diamonds, or cut their use to a minimum—dressing time is often reduced and cutters can be changed in a minute—or less!

Robbins & Myers, Inc., Springfield, Ohio, now uses Desmond precision mechanical dressers on a Cincinnati Centerless for grinding motor armatures. Mr. Worley, department foreman reports, "The new Desmond dresser does the job as fast as the single point diamond nibs we used previously. It costs half as much, and is a lot more rugged. We don't have to worry about accidental damage or loss of the diamond." Above is a close up of the new dresser installed on the centerless grinder in the Robbins & Myers plant.

Your industrial distributor has these new money-saving dressers. He can help you apply any of Desmond's complete line of dressers to your exact requirements. The Desmond-Stephan Mfg. Co., Urbana, Ohio.

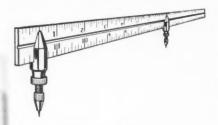
# the only complete line of grinding wheel dressing tools

## Desmond

the only complete line of DRESSERS & GUTTERS

#### **Trammel Heads**

Trammel heads which, in combination with a square or scale, are said to make an accurate compass, height gage, in-



**ERA Trammel Heads** 

side calipers, outside calipers, scriber, and so on, are now being marketed under the trade name of ERA by Engineering Research Associates, 3475 E. Nine Mile Rd., Hazel Fark, Mich. Recommended for engineers, draftsmen, patternmakers, layout men, tool and die workers, and other individuals, the heads are furnished in a set complete with scriber points, pencil tip, and special caliper points.



COMPLETE LINE

ADJUSTABLE AND

FIXED CENTER DRILL HEADS

# NEW TAP or DRILL UNIT by THRIFTMASTER

#### Features . . .

- Attaches to any drill press.
- Automatic reverse for tapping.
- Drills on same set up.
   Spindles adjustable to infinite variety of patterns.
- 5. Increases drilling and tapping production 2 to 6 times proportionately . . . lowers cost.

ately... lowers cost.

6. Light or heavy duty up to 1" capacity—2 to 10 spindles.

Subsidiary of Thomson Industries, Inc.

THRIFTMASTER PRODUCTS CORPORATION

DORMAN AUTOMATIC REVERSE TAPPERS

#### **Aluminum Electrode**

A welding electrode for aluminum and aluminum alloys, designated as Eutectrode 2101, is now being manufactured by the Eutectic Welding Alloys Corp., 40 Worth St., New York 13, N. Y. Possessing a tensile strength of 34,000 p.s.i., the electrode can be easily handled and is said to produce no objectionable smoke, thus allowing for full visibility of the weld at all times.

Claimed to present no difficulties in stop-and-start welding, the electrode is also said not to spatter, thus producing a smooth, dense weld without excessive waste. The low amperage required in using the electrode is claimed to minimize the danger of stress and damage to thin parts. Described as ideal for the reclamation of new castings and repair on old ones, the rod is available in ½ and ½-inch sizes.

#### Jig-Bored Die Sets

The Detroit Die Set Corp., 2895 W. Grand Blvd., Detroit 2, Mich., has announced that all leader pin holes and



"Detroit" Jig-Bored Die Set

guide bushing holes in "Detroit" standard die sets are now micrometric jig bored. According to the manufacturer, the diameters of the precision bored pin and bushing holes are indicated, explored, and held within the millionth decimal of an inch for the full length of each hole. Thus, registration between shoe and punch holder is claimed to be maintained to an unusual degree of accuracy. Microscopic comparisons also show that micrometric bored holes have a better finish than that attained by operations previously employed.

ously employed.

All Detroit die sets are not only jig bored but also factory assembled. Pins and bushings are pressed into the shoes and punch holders on specially engineered hydraulic presses, the even pressure of which assures that the pins accurately

follow the holes.

#### 15-Inch Drill Press

Atlas Press Co., 2346 N. Pitcher St., Kalamazoo, Mich., has announced a 15-inch capacity drill press for drilling and tapping operations which is available in high and Slo-speed models with a choice of full-tilting or production oil table, Jacobs chuck or No. 1 or 2 Morse taper spindle. Models offered include floor type, bench type, production base, and two, three and four-spindle drills.

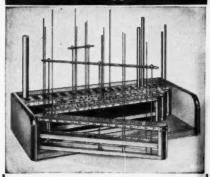
Outstanding features of the Atlas 15-



Atlas 15-Inch Drill Press

Inch Drill Press comprise a new floating drive with six-spline spindle and steel drive sleeve supported by two ball bearings; ground steel spindle supported by two widely spaced ball bearings; ground steel quill; new head casting design for added rigidity; and extra heavy head, column and base. In the bench type Slospeed model, the machine is designed to drill to the center of a 15-inch circle, has nine speeds from 400 to 4,400 r.p.m., 4-inch spindle travel, maximum height of 12 inches from the table to the chuck, maximum height of 16 inches from the base to the chuck, 10 x 10-inch table, and can be operated from a 1/3 or 1/2 h.p., 1,725 r.p.m. motor.

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- Maintain inventory in each size.
- Select proper size at a glance.
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- Conserve space it's compact.

#### HOLDS 20 LETTER 47 FRAC-TIONAL and 60 NUMBER SIZES

Each Arco Drill Rod Rack holds 26 letter, 47 fractional and 60 number sizes each indicated with its corresponding decimal size.

Take a look at your present method of storing drill rod and write for bulletin offered below.

#### Free Bulletin

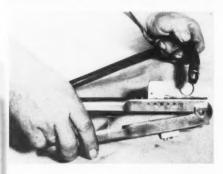
This four-page folder gives complete details of this modern, handy drill rod rack. Send for your copy today . . . ask for bulletin MM-50.



ACRO METAL STAMPING CO.

#### Ferrule Crimping Tool

As an added convenience for plant maintenance men, A. Schrader's Son Division, 475 Vanderbilt Ave., Brooklyn



Schrader Ferrule Crimping Tool

17. N. Y., has announced a portable ferrule crimping tool of sturdy, yet lightweight, construction which is designed for crimping metal ferrules when making 'on-the-job' hose repairs or installations. The tool utilizes, as the crimping medi-



#### **MAGNIFIES Vernier Scales**

The "hard-to-read" Vernier scales on height gages and calipers can NOW be read with ease. No more eye strain, no more guess work, or "hit and miss" in setting and reading these accurate instruments. • The lens is fine quality optical glass, specially designed and precision ground with utmost optical skill. Four times magnification shows lines true and correct with power to "BREAK" thousandths into "tenths" with ease. In three sizes. • Buy through your Distributor.

For Complete Information Write To

713 W. Lake Street Minneapolis 8, Minn.

um, two strands of music wire in loop form attached to the operating handles in such a way that closing the handles contracts the loop. The tool is designed so that the same wires make a wide range of loop sizes to permit servicing of hoses from ½ to 1½ inches in outside diameter.

#### Universal Lathe Toolholder

Precision machined from a solid steel block and hardened to provide long wear, a universal lathe toolholder designated as the "Acro-Grip" has been announced by the H. C. Clatfelter Co., Ferndale 20. Mich. With the holder, tools are said to be held firmly for chatter-free performance in cutting-off, turning and facing operations, and can be readily removed for sharpening without changing their position in relation to the work.

The design of the Acro-Grip permits an operator to turn or face from either side



"Acro-Grip" Universal Lathe Toolholder

of the holder. A standard drill chuck can be inserted into the holder to permit the operator to power drill and ream from the compound or, for extreme accuracy, a taper or straight shank drill or reamer can be inserted directly in the holder by using a standard Acro-Grip adapter bushing. Available for all lathes from 6 to 20-inch swing, the holder has a full 1-inch capacity for boring or threading bars; a standard Acro-Grip bushing can be used to adapt the holder to smaller boring or threading bars.

#### Stacking Box

The Style 800 Stacking Box now being manufactured by Bay Metal Products, 3015 N. 16th St., Philadelphia 32, Pa., is of spot-welded construction with reinforced corners and rivets for additional strength. The box is provided with a drop handle at each end and features a continuous stacking rim on all four sides.

#### New Shop Literature

The publications listed in this section may be obtained free upon written request on company letterhead to the manufacturers concerned. Your courtesy in mentioning MODERN MACHINE SHOP when requesting copies of these publications will be sincerely appreciated by the manufacturer and the publisher of this magazine.

Groove Pins for holding machine parts are illustrated, described, and listed as to prices and dimensions in a four-page catalog published by Jöhn Gillen Co., Inc., 2542 S. 50th Ave., Cicero 50, Illinois.

Self-Lubricating Bearings. A 16-page catalog (L-5) on Ledaloyl self-lubricating bearings published by the Johnson Bronze Co., 590 S. Mill St., New Castle, Pa., lists and describes Ledaloyl parts that are most in demand.

Standardized Right-Angle Gear Units. Airborne Accessories Corp., 25 Montgomery St., Hillside 5, N. J., has issued a four-page two-color folder which illustrates and describes standardized right-angle gear units with universal mounting for use in either manual or power operated systems.

"Step Up Production" is the title of a 36-page booklet on the use of abrasive belts which has been announced by the Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn. The booklet provides case-history examples and technical data on grinding and polishing with abrasive belts, bringing up to date the information published in the previous "Step Up Production" booklet. In addition, the booklet provides details on belt equipment, belts, and various contact wheels.

Magnetic Coolant Separators. The Barnes Drill Co., 860 Chestnut St., Rockford, Ill., has published a 16-page two-color bulletin (300-A) describing and ilstrating the "Barnesdril" Magnetic Coolant Separator for honing machines, grinders, milling machines, broaching machines, gear shaving machines, metal roll forming mills, and so on, the separator being so designed that used coolant from the operation flows into the separator directly from the machine. Specifications, dimensional layouts and information on attachments and installation are included.



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Sprockets and Chain. Of interest to users of all types of sprockets and chain for power transmission is a 52-page sprocket and chain buying guide (Catalog No. 50) issued by the Cullman Wheel Co., 1352-V Altgeld St., Chicago 14, Ill., which contains 17 pages of illustrations and 35 pages of specification tables.

Free-Cutting Steel. Jones & Laughlin Steel Corp., 311 Ross Ave., Pittsburgh 30, Pa., has announced a revised, six-page edition of the original booklet on J&L "E" Free-Cutting Steel, which provides a more complete description of this Bessemer screw stock, as well as additional data on actual uses.

Carbide Header Die Nibs. The Carboloy Co., Inc., 11143 E. 8 Mile Ave., Detroit 32, Mich., has published a bulletin (Supplement D-4) listing rough cored carbide header die nibs which are available in sizes ranging from %-inch o.d. x ¾ inch long and having a cored holes size of 0.060 inch, to 1¼-inch o.d. x 2½ inches long and having a cored hole size of 0.330 inch. A leaflet on the assembly, finishing, and maintenance of these die nibs is also available.

Cutter and Tool Grinding Machine. A 24-page two-color bulletin published by the Brown & Sharpe Mfg. Co., Providence I. R. I., describes and illustrates its No. 10N Cutter and Tool Grinding Machine available with plain and universal equipment. Specifications and information on typical setups and additional equipment are also included.

Pressroom Equipment. A four-page bulletin (No. 01) published by the F. J. Littell Machine Co., 4163 Ravenswood Ave., Chicago 13, Ill., explains and illustrates its line of roll feeds and dial feeds for all makes of punch presses and straightening machines; air-blast valves; "Pres-Vac" safety feeders; and mechanical pickers.

Universal Boring Fixture. The Ex-Cell-O Corp., Detroit 32, Mich., is distributing a four-page pictorially illustrated bulletin (No. 31101) describing a universal boring fixture available in both manually and hydraulically-operated types for use on all styles of Ex-Cell-O precision boring machines. Various types of small production run jobs with detailed captions are illustrated. Construction features and specifications for each style of fixture are listed.

Dust Collecting Equipment. Data for the rapid selection of the correct size unit type dust collector for any industrial dust problem requiring from 200 to 3.500 c.f.m. are presented in Bulletin 610 issued by the Aget-Detroit Co., 207 Main at Washington St., Ann Arbor, Mich. Included are general recommendations of typical wheel sizes that any single dust collector will handle. Also presented is a method for determining the correct amount of air suction required at any wheel.





# IMMEDIATE DELIVERY Extra Long Length High Speed DRILLS

:	Straight No. 1			Size Inches	Length Overall Inches	Length Flute Inches	Price Each Net
No. By Gage  1 to 10  11 to 20  21 to 30  31 to 40  41 to 50  51 to 60	1 ) ) )	61/4 53/4 53/8 51/4 41/2 41/4	\$ .90 .80 .70 .60 .50	13/32 27/64 7/16 29/64 15/32 31/64 1/2	12 12 12 12 12 12 12 12	999999	2.75 3.00 3.00 3.25 3.25 3.25 3.25
Straight Shank			Taper Shank				
Size Inches	Length Overall Inches	Length Flute Inches	Price Each Net	17/32 9/16	15 15	12 12	6.50 7.00
1/8 9/64	12 12	9	\$1.50 1.50	19/32 5/8	15 15	12 12	7.50 8.00
5/32	12	9	1.50	21/32	15	12	8.00
11/64	12	9	1.50	11/16	15	12	8.25
3/16	12	9	1.50	23/32	15	12	8.50
13/64	12	9	1.60	3/4	15	12	8.50
7/32	12	9	1.60	25/32	15	12	9.50
15/64	12 12	9	1.75	13/16	15 15	12 12	11.00 11.50
1/4 17/64	12	9	1.75	27/32 7/8	15	12	12.00
9/32	12	9	1.85	29/32	15	12	12.50
19/64	12	9	2.00	15/16	15	12	13.00
5/16	12	9	2.00	31/32	15	12	14.00
21/64	12	9	2.25	1	20	15	16.00
11/32	12	9	2.25	1-1/16	20	15	17.00
23/64	12	9	2.50	1-1/8	20	15	18.00
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25/64	12	9	\$2.75	1-1/4	20	15	22.00

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(Front row, left to right)—H. E. Collins, Hughes Tool Co., Houston, Texas, First Vice President; L. Tigges, Baker Bros., Toledo, Ohio, President; and J. J. Demuth, Sligo, Inc., St. Louis, Second Vice President.

(Rear, left to right)—George A. Goodwin, Standard Electric Co., Dayton, Ohio, Treasurer; Roger F. Waindle, Elgin National Watch Co., Aurora, Ill., Third Vice President; W. B. McClellan, Gairing Tool Co., Detroit, Mich., Secretary; and W. A. Thomas, Ford Motor Co. of Canada, Windsor, Canada, Ass't. Secretary-Treasurer.

#### **New ASTE Officers**

HE election of Herbert L. Tigges. L Vice President, Baker Bros., Toledo, Ohio, to the Presidency of ASTE was announced last month during the annual meeting of the Society in Philadelphia. Succeeding Mr. Tigges as First Vice President is J. J. Demuth, Methods Engineer & General Superintendent, Sligo Iron Works, St. Louis, Missouri, H. E. Collins, Engineer with Hughes Tool Company, Houston, Texas, was elected Second Vice President and Roger F. Waindle of Elgin National Watch Company, Aurora, Illinois, was named Third Vice President.

W. B. McClellan, Gairing Tool Company, Detroit, Michigan, and George A. Goodwin, Chief Tool Engineer, Standard Electric Company, Dayton, Ohio, were re-elected National Secretary and Treasurer, respectively. H. E.

Conrad is Executive Secretary of the technical society.

Elected to the Board of Directors were the following: H. L. Tigges, Executive Vice President, Baker Bros., Toledo; L. B. Bellamy, Sterling Grinding Wheel Co., Detroit: Jos. T. Crosby. Vice President, Lapointe Machine Tool Co., Hudson, Mass.; J. J. Demuth, Methods Engineer and General Superintendent, Sligo, Inc., St. Louis, Mo.; T. J. Donovan, Jr., President, T. J. Donovan Company, Philadelphia; R. B. Douglas, President, Godscroft Industries, Montreal; V. H. Ericson, President, Johnson DeVou, Inc., Worcester, Mass.; E. W. Ernst, Superintendent of Punching Tool & Die Div., General Electric Co., Schenectady, N. Y.; B. L. Hazewinkel of the L. S. Starrett Co., Denver: A. D. Lewis, Manager, Art Lewis Production Equipment Co., Glendale, Calif.; and Fred J. Schmitt, Director, D. A. Stuart Oil Co., Ltd., Chicago.

New York City was selected as the site for next annual ASTE Convention in March, 1951. The next industrial exposition to be held by the technical society is scheduled for the week of March 17, 1952, in Chicago.

#### Research Foundation

Setting up of a research foundation to carry on basic production research was authorized at the annual Board of Directors meeting of the American Society of Tool Engineers. An initial fund of \$25,000 was appropriated at the same time.

Plans call for the use of existing production research facilities at various universities and colleges. The foundation also will act as an intermediary to assist small industries or companies interested in basic research but not in a position to finance such research.

The ASTE Board of Directors also adopted a resolution to work with the Army Ordnance Association on national preparedness plans.

#### Scholarship Fund

A \$25,000 scholarship fund offered by an anonymous Chicago concern to permit increased Tool Engineering scholarships in the State of Illinois was accepted by the Board of Directors of the Society.

#### Honorary and Life Memberships

An Honorary Membership was awarded by the ASTE to Senator Ralph E. Flanders of Vermont for "lifetime contributions to Tool Engineering." Senator Flanders has been an ASTE member for a number of years.

A life Membership was awarded to E. W. Ernst, Chairman of the ASTE Handbook Committee, for his contributions to the compiling and publication of the first handbook devoted to the profession.

## CARLCO Tool & Cutter GRINDER



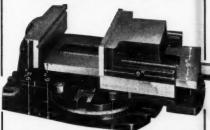
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Milling Machine. A 12-page two-color bulletin (No. M-1700) published by The Cincinnati Milling Machine Co., Marburg Ave., Cincinnati 9, Ohio, describes and illustrates the Cincinnati No. 3 MI Milling Machine which is built in plain or universal styles for precision general purpose and toolroom milling. The bulletin fully covers the features and specifications of the machine. A diagram of the machine is also included.

Precision Machining, Grinding, and Lapping. A four-page two-color folder has been published by Acme Industrial Co., 212 N. Laflin St., Chicago 7, Ill., which illustrates and explains the company's facilities for machining, grinding, and lapping parts to precise specifications.

Flexible Shaft Machine. The Foredom Electric Co., Dept. B-2127, 27 Park Place, New York 7, N. Y., has published a two-color bulletin on its 900 Series Flexible Shaft Machine for medium duty grinding and finishing operations. The bulletin explains and illustrates the machine and the five handpiece types which are available.

Spiral End Mills. National Twist Drill & Tool Co., Rochester, Mich., has published an eight-page two-color booklet which includes illustrations, specifications, and prices of its "Helex" short series fast spiral end mills which are available in right-hand spiral, right-hand cut only. Three-fluted double-end regular series end mills are also listed.



Boring Heads. Flynn Mfg. Co., 437 Bates St., Detroit 26, Mich., has published a two-color bulletin on its new doverall type boring heads which are specially designed for small jig borers, turret lathes, and light milling machines. Complete specifications and details of construction are included.

Set Screws. Set Screw & Mfg. Co., 152
Main St., Bartlett, Ill., has published a 16page three-color catalog (No. 12) which
contains list prices and descriptive information on hexagon socket set screws,
hexagon socket cap screws, socket pipe
plugs, hexagon keys, slotted headless set
screws, hexagon head set screws, slotted
pipe plugs, slabbed or milled head set
screws, and studs.

Universal Electric Tools. Independent Pneumatic Tool Co., 175 State St., Aurora, Ill., has released a circular (JE-1148) covering Thor "Copper Line" tools, including ¼ and ½-inch universal electric drills. Also illustrated and described are stands available for these drills.

Rotary Surface Grinder. A six-page two-color bulletin (No. 145-3RM) published by the Mattison Machine Works, Rockford, Ill., describes and illustrates the No. 24 Mattison Duplex Rotary Surface Grinder which is said to be two machines in one and provides for convenience and simplicity of operation. The bulletin includes a general description of the machine, together with data on applications and specifications.

## WHERE TO GET IT



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### Over The Editor's Desk

### Sitting On a Booby-Trap

To most people the science of the management of money seems a simple matter; all one has to do is to get as much of it as possible and spend as little as possible. Actually, the science of money is so involved that it is said among bankers and financiers that there are only nine men in the United States who thoroughly comprehend the science. One of these, incidentally, is the so-called "elder statesman" Bernard J. Baruch, whose sound advice to President Truman has gone unheeded—principally for the reason that Truman doesn't know any more about the handling of money than most of the rest of us, if as much.

This much is certain, however; money is power, and the more of the people's money the government can concentrate in its own hands, the more power it will have over the people from whom it has taken the money. A piece of gold or a bank-note will not, in itself, add one whit to a man's well-being; he can neither eat it, nor drink it, nor wear it, but it represents the real wealth of the country; land, homes, living accessories, food, and hours of productive labor.

Money, therefore, becomes the life blood of the nation's commerce and industry. When it ceases flowing, the nation gasps for the breath of life. When it flows plentifully, the nation is healthy in the measure to which each of its citizens controls that portion of the nation's wealth to which he, by virtue of his personal contribution to society, is entitled. But when one agency has the power to decree that a portion of every man's income is to be turned over to that agency, it simply means a concentration of power—even the power to destroy—in the hands of one person or one group.

Taxes are, of course, necessary for the operation of a civilized country, but if the maximum of freedom and liberty are to be maintained for the citizens of that country, only enough tax should be imposed to provide adequate government. Now, the American people have put into power at the head of their government a President and a supporting group of Congressmen who have passed legislation to force the American people to pay high taxes in order to provide money with which the President and his supporters can buy, through subsidies and other handouts, the votes of the several groups needed to keep them in office.

The United States currency, at the present time, is a dishonest currency. The government has stated that a dollar is worth so much gold, but has forbade the redemption of the dollar by the exchange of gold. Further, it has concentrated all available stocks of gold in government hands; thus the government can, practically at will, set any price it wishes on that gold. With control of the gold supply, the government can

Furthermore, the present administration has embarked upon a career of spending much more than it receives, with no fear that the Treasury will run out of dollar bills, because the government through its banking system can create as many as it needs. This inflation of the currency will, in the end, completely ruin the value of savings and make the citizens entirely dependent upon government handouts.

In his book "The Economic Consequences of the Peace," John Maynard Keynes said, "Lenin is said to have declared that the best way to destroy the capitalist system was to debauch the currency. By a continuing process of inflation, governments can confiscate, secretly and unobserved, an important part of the wealth of their citizens. By this method they not only confiscate but they confiscate arbitrarily, and while the process impoverishes many, it actually enriches some.

"Lenin was certainly right. There is no subtler, nor surer, manner of overturning the existing basis of society than to debauch the currency. The process engages all the hidden force of economic law on the side of destruction, and it does it in a manner in which not one man in a million is able to diagnose."

President Truman's government is going to spend five billion dollars more this year than it receives in taxes. Five billions alone won't wreck the country, but if our government spends five billions more than it receives this year, and the next year, and the next, it will be forced to resort to further inflation and corresponding reduction in value of the currency in order to maintain a semblance of solvency. And inflation—judging from the results in every country in which it has ever been tried—is a boobytrap which sooner or later will blow up and completely wreck the country's business.

If and when that bust comes, it will be an easy matter for those in power to complete the socialization of the country—and socialization means regimentation, austerity and poverty for all alike.

We have been asleep. Are we going to wake up in time?

Howard Campbee

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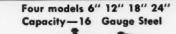
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# Workers get clean faces, employer lowers fuel bills with ROTO-CLONE



roof to conserve space.

One of 8 Type N Roto-Clones serving buffing room. Unit mounted on

Partial View of buffing

THIS large buffing room of a Bridgeport, Conn. manufacturer processes over 850 varied products of different shapes. Equipment includes dial buffers, arbor buffers, buffing lathes and polishing machines.

Previous dust control methods gave the workers only partial protection. In addition, exhausted air was not cleaned sufficiently to permit recirculation. Result—high heating costs, and drafts resulting from open window ventilation.

With the installation of a dust control system consisting of 8 Type N Roto-Clones,\* all problems were solved. Working conditions were improved to the point where buff operators, for the first time, had clean faces. Because of Roto-Clone's high efficiency cleaning, exhausted air can now be recirculated to the working areas during the winter months. Result—savings in fuel that over a three year period will offset the difference in cost between Roto-Clone Type N wet separation and other dry separation methods.

Roto-Clone dust control returns dividends in many ways—and there's a type and size to meet every problem. Ask your local AAF representative for copy of Bulletin No. 270 describing Roto-Clone's many applications or write direct to—

### AMERICAN AIR FILTER COMPANY, INC.

100 Central Avenue, Louisville 8, Ky. In Canada: Darling Bros., Ltd., Montreal, P. Q.



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DUST CONTROL EQUIPMENT



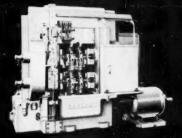
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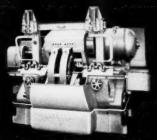
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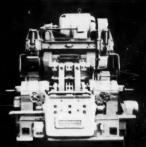




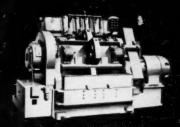
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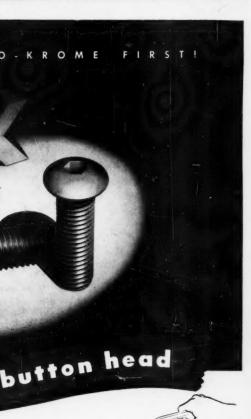
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